

AD-A245 333



NAVAL POSTGRADUATE SCHOOL Monterey, California

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THESIS



Deming's Management Philosophy
and the Defense Industrial Base

By

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June 1991

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92-02430



REPORT DOCUMENTATION PAGE				Form Approved GMB No. 0104-0188	
1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b RESTRICTIVE MARKINGS		
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION AVAILABILITY OF REPORT		
2b DECLASSIFICATION/DOWNGRADING SCHEDULE					
4 PERFORMING ORGANIZATION REPORT NUMBER(S)			5 MONITORING ORGANIZATION REPORT NUMBER(S)		
6a NAME OF PERFORMING ORGANIZATION NAVAL POSTGRADUATE SCHOOL		6b OFFICE SYMBOL (If applicable) 54	7a NAME OF MONITORING ORGANIZATION NAVAL POSTGRADUATE SCHOOL		
6c ADDRESS (City, State, and ZIP Code) MONTEREY, CA 93943-5000			7b ADDRESS (City, State, and ZIP Code) MONTEREY, CA 93943-5000		
8a NAME OF FUNDING SPONSORING ORGANIZATION		8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c ADDRESS (City, State, and ZIP Code)			10 SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO	PROJECT NO	TASK NO
			WORK UNIT ACCESSION NO		
11 TITLE (Include Security Classification) DEMING'S MANAGEMENT PHILOSOPHY AND THE DEFENSE INDUSTRIAL BASE					
12 PERSONAL AUTHOR(S) GRAFF, DAVID JACQUES					
13a TYPE OF REPORT MASTER'S THESIS		13b TIME COVERED FROM _____ TO _____		14 DATE OF REPORT (Year, Month, Day) JUNE 1991	
15 PAGE COUNT 100					
16 SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the DoD or the U.S. Government.					
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	TOTAL QUALITY MANAGEMENT; DEFENSE INDUSTRIAL BASE; DEMING MANAGEMENT PHILOSOPHY; TQM		
19 ABSTRACT (Continue on reverse if necessary and identify by block number) The purpose of this thesis is to analyze why firms are leaving the defense industrial base and to determine if Dr. Edwards Deming's Management Philosophy can offer a more constructive way of doing business in the Defense Acquisition System. A comparative analysis was conducted between industry's reasons for wanting to leave the defense sector and Deming's Management Philosophy. This analysis, determined if adoption of Deming's Management Philosophy can possibly help alleviate industry's existing concerns in addition to providing a means to incentivize industry to remain in the defense sector.					
20 DISTRIBUTION AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input checked="" type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a NAME OF RESPONSIBLE INDIVIDUAL Rodney F. Matsushima, CDR, SC, USN			22b TELEPHONE (Include Area Code) (408) 646-2775		22c OFFICE SYMBOL CODE AS/Ms

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Deming's Management Philosophy
and the Defense Industrial Base

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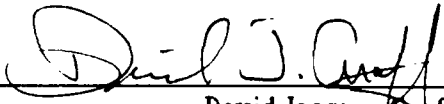
Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

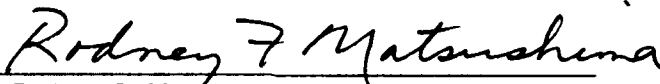
from the


NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	GENERAL	1
B.	OBJECTIVES OF THE RESEARCH	1
C.	RESEARCH QUESTIONS	2
D.	SCOPE	2
E.	ASSUMPTIONS	2
F.	LITERATURE REVIEW	3
G.	METHODOLOGY	3
II.	DEMING MANAGEMENT PHILOSOPHY	4
A.	INTRODUCTION	4
B.	THE DEMING MANAGEMENT PHILOSOPHY	8
C.	SYSTEM OF PROFOUND KNOWLEDGE	10
D.	SUMMARY	20
III.	BACKGROUND	22
A.	INTRODUCTION	22
B.	THE DEFENSE INDUSTRIAL BASE	22
C.	EVOLUTION OF THE DEFENSE INDUSTRY	24
D.	ROLE OF CONGRESS	28
E.	DEFICIT REDUCTION ACT	28
F.	CONGRESSIONAL JUSTIFICATION FOR CICA	30
G.	CICA IMPLEMENTATION	33
H.	CICA AND THE PROTEST PROCESS	37
I.	CONGRESS AS OVERSEERS	37
J.	INDUSTRY AND THE MARKET PLACE	40
K.	THE GROWTH OF MICROMANAGEMENT	42

L. CONGRESS	44
M. ON THE HORIZON	46
N. SUMMARY	49
IV. ANALYSIS	52
A. DSMC STUDY	52
B. TQM SURVEY FINDINGS	56
C. SURVEY COMPARISONS	57
D. OBSERVATIONS	61
E. MANAGEMENT'S WILLINGNESS TO CHANGE	62
F. CHANGE	65
G. CHAPTER SUMMARY	67
V. CONCLUSIONS AND RECOMMENDATIONS	68
A. CONCLUSIONS	68
B. RECOMMENDATIONS	69
C. RESEARCH QUESTIONS	70
D. SUGGESTED FOR OTHER RESEARCH	71
APPENDIX A	72
A. INTRODUCTION	77
B. SURVEY OBJECTIVE	77
C. SURVEY FORMAT	77
D. SOLICITATIONS, RESPONSES, AND DEMOGRAPHICS	78
E. SURVEY RESPONSE SUMMARY	78
F. BARRIER OVERVIEW	81
G. CHAPTER CONCLUSION	87
APPENDIX B: DSMC SURVEY	88
LIST OF REFERENCES	90
INITIAL DISTRIBUTION LIST	93

I. INTRODUCTION

A. GENERAL

In the early 1980's, America undertook the largest military buildup and modernization of its armed forces ever conducted during a peacetime economy. It was in the wake of this huge military buildup that the public became increasingly wary of the Department of Defense's (DoD's) procurement practices. Media dramatization of soaring weapons procurement costs, pricing scandals, and images of crooked defense contractors shaped public opinion into believing that the DoD's procurement practices were out of control, its officials inept, and all defense contractors were crooks. In reaction to public dismay, the United States Congress mandated that competition would be the watchword in all future DoD procurement practices (via the Competition in Contracting Act of 1984) [Ref. 1: p 118].

There are many problems associated with DoD management practices related to the acquisition of major systems. Four broad problems include:

1. Deficiencies in military strategy
2. Congressional micromanagement and the budget process
3. The acquisition process (legislated competition, dual sourcing)
4. And a dwindling, and less capable industrial base.

The last problem stated is a result of the first three problems mentioned and is the focus of this thesis

B. OBJECTIVES OF THE RESEARCH

This thesis has three main objectives. They are as follows:

1. Based on analysis of previous studies and surveys on the industrial base, this research effort will try to determine the apparent reasons behind industry's growing desire to leave the defense industrial base. It is the further objective of this effort to:
2. to determine if Deming's Management Philosophy may possibly offer the Government a means to eliminate these reasons; and

3. with today's declining defense budget a reality, determine if this exodus of firms from the defense sector is unacceptable to national objectives.

C. RESEARCH QUESTIONS

1. Given the preceeding objectives;

- a. Can implementation of Deming's Management Philosophy, help eliminate the reasons why firms are leaving the defense industrial sector?

2. Subsidiary Research Questions

- a. What is Deming's Management Philosophy?
- b. What was the Congressional intent of the Competition in Contract Act of 1984 (CICA)?
- c. What are the concerns and reason prompting firms to leave the defense industrial base?

D. SCOPE OF THESIS

The scope of this thesis is to provide a useful analysis of why industry is leaving the defense sector and if Deming's Management Philosophy can provide a means to counter this trend.

The areas focused on included

1. Background on the Deming Management Philosophy, to determine if it can provide an insight towards a more constructive method of conducting business with industry.
2. A general description of the evolution of policy and legislation leading to the formulation of the Competition in Contracting Act of 1984, to determine what Congress' initial intent was.
3. Background on the evolution of the American Defense Industrial Base.
4. Background of existing studies on the defense industry's departure from the defense industrial base.
5. Analysis of barriers constricting the possible successful adoption and implementation of Deming's Management Philosophy within the DoD.

E. ASSUMPTIONS

This thesis will be written under the following assumption:

1. The reader possesses an equivalent educational and experience level in the Defense Acquisition Process as does the researcher.
2. It is recognized that the DoD definition of Total Quality Management (TQM), and Dr. Deming's Management Philosophy do not entirely agree. However, for the purposes of this thesis, Deming's Management Principles will be utilized.

F. LITERATURE REVIEW

Approximately 103 books, articles, reports, studies, and hearings were reviewed during this research. The literature search concentrated on information available from public and private agencies that reviewed and specialized in the research areas.

G. METHODOLOGY

The methodology employed in the research of this thesis consisted of the following components:

1. Literature research and interviews were utilized to research and discuss the Competition in Contracting Act of 1984, and the Defense Industrial Base.
2. Proficiency and understanding of the Deming Management Philosophy were accomplished through the following:
 - a. Literary research on Deming's Management Philosophy and TQM.
 - b. Attendance of Dr. Deming's Quality, Productivity and Competitive Position Seminar.
 - c. Discussions with Deming Management Philosophy Experts, Dr. Phillip E. Miller Ph.D., and Dr. Kosaku Yoshida Ph.D.
3. Data was utilized and further analyzed from information gathered from a thesis survey conducted by LCDR Andy Brown, entitled "Barriers to Implementing Total Quality Management in the DoD Acquisition Process."
4. Follow-up interviews with selected individuals.

II. DEMING MANAGEMENT PHILOSOPHY

The purpose of this chapter is to provide the reader with some understanding of Deming's Management Philosophy. Without a basic understanding of what Dr. Deming refers to as the System of Profound Knowledge, any analysis utilizing the Deming Management Philosophy will be meaningless to the reader.

A. INTRODUCTION

Dr. W. Edwards Deming, a 1928 Yale University graduate, has been acknowledged as the consultant/statistician whose work in management theory greatly influenced the Japanese industrial recovery during the post World War II era. This industrial revitalization which concurrently revolutionized the productivity and quality of Japanese products, took place as a result of their assimilation of Dr. Deming's new principles of management. Dr. Deming did not become a recognized figure in the United States until around 1980 when the National Broadcasting Corporation (NBC) produced a documentary accrediting Dr. Deming's contributions and influence towards the success of the Japanese industrial sector [Ref. 2:p 3].

Post World War II Japan was an ideal environment for Dr. Deming's philosophies statistical quality control to be readily accepted and assimilate. To fully understand the reasons behind the Japanese acceptance and incorporation of Deming's philosophy, it would first be prudent for the reader to understand the basic cultural differences between Japan and the United States.

The United States during its major growth and expansionist era (the 1800's saw the United States quadruple in size) was a nation confronted with a population too small to fully exploit the abundance of natural resources that it possessed. The existing population and increasing flow of immigrants were openly encouraged to dream the impossible dream, to "go West young man" and start a new life. There was little or no Governmental interference acting as a barrier to expansion or open competition to

fully develop the untamed potential of America's untapped resources. America's work ethic, it can be concluded, was founded on the principle of competition (*laissez faire*). The harder you worked the more you got ahead. Dreams were within everyone's reach. This spirit of freedom, individuality, and competition, was and is our country's major guiding behavioral philosophy, from the individual to the large corporation.

With America's historical development in mind, let us take a look at Japan's historical development. Japan is a country the size of the state of California, consisting of primarily four large islands with mountain ranges dominating most of them, leaving less than 15% of the total land mass is arable. The population on the main island of Honshu, is greater than one hundred million or equal to one half of the United States. This makes Japan a very densely populated country, with most of its population huddled around its major cities. To compound matters, Japan's only natural resource in a significant quantity is its people. Nearly 100% of Japan's energy requirements and almost all of its food are imported.

The development of the Japanese society has followed a course opposite that of the United States. Japan has for over fifteen centuries been a nation isolated from the rest of the world. Conceived of one nation, race, and religion, they have neither had nor desired any interaction with other ethnic groups. Their history as a result, has been developed out of isolationism with one unified value and social system. The existing social values of Japan were developed out of a necessity to survive as an isolated nation, and are well established and widely accepted. The Japanese share a common concept of the desirable person or worker, to the extent that "it is difficult for the unique or individualistic person to survive in Japan." [Ref. 3] As noted through discussions with Dr. Yoshida, an associate of Dr. Deming, this type of controlled behavior may also explain why unique and historic inventions or discoveries by a Japanese is so rare [Ref. 3] "All Japanese institutions consciously try to discourage or eliminate

individualism and free competition to maintain the social status quo." [Ref. 4:p 18]
Consequently, the Japanese prefer those individuals "who are cooperative and get along with others" as opposed to those who are "aggressive and competitive." [Ref. 4:p 18]

In Japan, individualism is viewed as a threat to their social structural order. Competition between individuals is rare in their society, and is in fact openly discouraged with one exception; their national education system.

In the Japanese educational system, any individual can enter any prestigious university by simply passing the entrance exam. "Wealth, social status, position of the family, or alumni status of the parents have no bearing on admission standards." [Ref. 4:p 18] Every individual in Japanese society regardless of his background, "starts from the same point in elementary school to acquire his position in society on his own merits" [Ref. 4:p 19] In discussions with Dr. Yoshida, he explained that the competition in this type of educational system to enter the top universities is fierce. The Educational institutions themselves classify the individuals into their different working classes. The purpose of this system, he explains is to reduce the intensity of competition in society and make the individual competitive through the development of the ethics of hard work. [Ref. 3]

This accepted type of "free competition" in the social structure is over once the individual leaves school. Since competition is no-longer acceptable, the individual's efforts are directed towards intangible values (intrinsic) such as respect and recognition. They compete for social values. The individual considers the total benefit to the company's well being before his own; "...there is a spirit of cooperativeness. Therefore, energy which would have been wasted in fruitless individualistic competition is directed towards more productive use." [Ref. 4:p 20]

The prosperity and success of the Japanese business community following World War II was directly influenced and shaped by the following factors:

1. A strong Government leadership in planning economic development;
2. A significant inflow of technology and capital investment from the United States;
3. An emphasis on cooperation within almost every level of economic structure;
4. A high quality work force;
5. A high percentage of engineers in top management positions. [Ref. 5:p 1]

This unique cultural environment embraced Dr. Deming's teachings. His doctrine was perfectly suited for implementation and incorporation into their management philosophy.

Japanese companies usually have a company philosophy. The Japanese tend to believe that once the basic foundation of a company's philosophy is created and ingrained, everything else will fall into place (corporate goals, objectives, job specifications, etc) and support the philosophy. U.S. companies on the other hand, pursue the opposite approach, emphasizing clear cut objectives and detailed job specifications. It is believed by many Deming advocates that this is one of the primary reasons why many U.S. corporations are reluctant to adopt the Deming management style. "Americans tend to need measurable performance targets, such as the dollar amount increase in loan volumes or percentage decrease in operating costs to guide their performance attitudes and objectives." [Ref. 3]

Dr. Yoshida has termed this American approach as "analytic" and the Japanese approach as "holistic". The analytic approach implies that if each part is perfect, then the aggregate of the parts, or the whole, should be perfect as well. This is a "microscopic" approach that focuses on the individual parts rather than on the whole. "Americans seek to understand the whole by dissecting it into parts." [Ref. 3] The holistic approach infers that even if each part is perfect, the whole may not be

perfect. Dr. Deming has utilized the term "synergism" to describe this approach, "that the totality is more than simply the sum of the individual parts." [Ref. 6]

B. THE DEMING MANAGEMENT PHILOSOPHY

The management philosophy of Dr. Deming even though he does not refer to it as such, has become known as the TQM philosophy. TQM incorporates within its philosophy the system of profound knowledge. The system of profound knowledge is a combination of four major disciplines: human psychology, statistical theory, system theory, and the theory of knowledge. [Ref. 7:p 2] To provide a basis for understanding, Dr. Deming has defined his TQM philosophy for the business world through the now famous "14 Points" and the "Deadly Diseases". These 14 points and deadly diseases are the foundation for Deming's principles for transformation incorporated within TQM. It should be noted that Deming has revised and modified these 14 points for industry several times since their inception. He acknowledges openly that systems change over time. His guiding principles must take into consideration these changes to effectively reflect the environment in which these principles must operate. This in turn will remove the obstacles he perceives as barriers precluding industry from achieving the goals of quality and productivity. [Ref. 8:p 42] Deming's management philosophy was originally directed towards the public business environment. The basic premise of TQM is that it applies to anyone who has customers. TQM is customer orientated, and since the DoD is itself a large corporation, the principles of TQM can also be adopted and applied to it.

Below are the 14 Points, which constitute Dr. Deming's theory of management as they were provided to this researcher during Dr. Deming's November 1990 Quality enhancement seminar. [Ref. 9]

1. Create and publish to all employees a statement of the aims and purposes of the company or other organization. The management must demonstrate constantly their commitment to this statement.

2. Learn the new philosophy, top management and everybody.
3. Understand the purpose of inspection, for improvement of processes and reduction of cost.
4. End practice of awarding business on the basis of price tag alone.
5. Improve constantly and forever the system of production and service.
6. Institute training (for skills).
7. Teach and institute leadership.
8. Drive out fear. Create trust. Create a climate for innovation.
9. Optimize toward the aims and purposes of the company the efforts of teams, groups, staff areas, too.
10. Eliminate exhortations for the work force.
11.
 - a. Eliminate numerical quotas for production. Instead, learn and institute methods for improvement.
 - b. Eliminate M.B.O. (management by objective). Instead, learn the capabilities of processes, and how to improve them.
11. Remove barriers that rob people of pride of workmanship.
12. Encourage education and self-improvement for everyone.
13. Take action to accomplish the transformation.

The deadly diseases which were referred to earlier are the pitfalls that stand in the way of the successful implementation of Deming's 14 points. If these symptoms are permitted to occur they will cause the transformation effort to fail. [Ref. 9]

1. Lack of constancy of purpose to plan product and service that will have a market and keep the company business, and provide jobs.
2. Emphasis on short-term profits: short term thinking (just the opposite from constancy of purpose to stay in business), fed by fear of unfriendly takeover, and by push from bankers and owners, for dividends.
3. Personal review system, or evaluation of performance, merit rating, annual review, or annual evaluation, or annual appraisal, by whatever name, for people in management, the effects of which are devastating. Management by objective, on a go, no-go basis, without a method for accomplishment of the objective, is the same thing by another name. Management by fear would still be better.
4. Mobility of management: job hopping.

5. Use of visible figures only for management, with little or no consideration of figures that are unknown or "unknowable".
6. Excessive medical costs.
7. Excessive costs of liability, fueled by lawyers that work on contingency fees.

According to Deming, implementing the 14 points while trying to avoid the deadly diseases is not feasible without understanding how the system of profound knowledge functions. He states that although it is not necessary for "a manager" to become an "expert" in the concept of Profound Knowledge, it is necessary for him to grasp a functional understanding of the four disciplines mentioned and how they interrelate with each other. This will aide in full optimization of the system. [Ref. 3]

C. SYSTEM OF PROFOUND KNOWLEDGE

The system of profound knowledge is composed of four interrelated parts.

1. Appreciation for a system
2. Theory of variation
3. Theory of knowledge
4. Knowledge of psychology

Dr. Deming states that "one need not be eminent in any part of profound knowledge in order to understand it as a system and apply it." [Ref. 6] However, he also stresses that the components of the system of profound knowledge can not be separated, they interact with each other. This implies that it is impossible to understand the theory of knowledge of psychology without understanding the theory of knowledge of variation. The TQM philosophy stresses that it is vital for a manager as a leader of people to have some knowledge of variation and psychology. [Ref. 10:p 11]

The theory of variation, in its role as it influences the optimization of a system, is necessary to further the manager's understanding of the differences between people and their interactions with others and the systems they work in.

An understanding of the theory of knowledge is required for the manager to grasp the concept and importance of rational prediction. "Management in any form is prediction. Management acts on a causal system, and on changes in the causes." [Ref. 3]

1. What is a System?

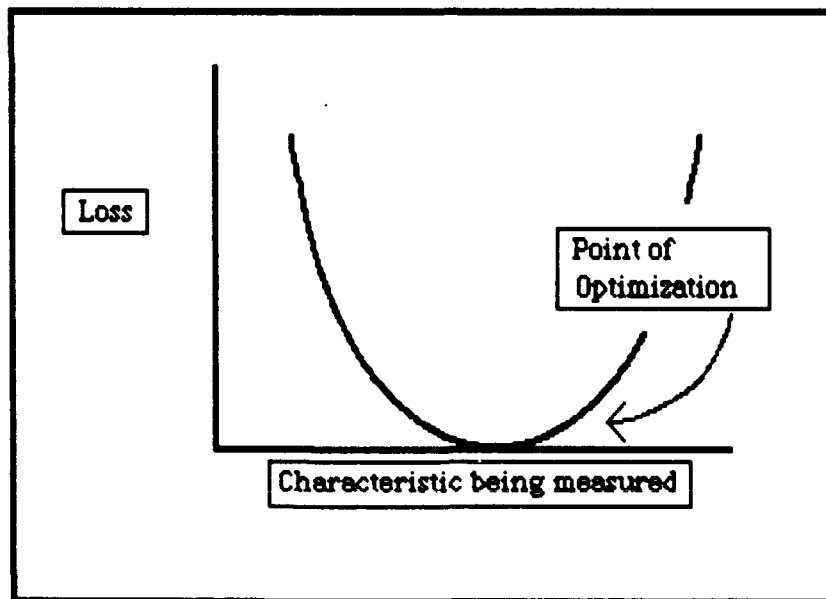
A system is a series of functions or activities within an organization that work together for the aim of the organization. [Ref. 3] Deming's management philosophy is based on the fact that in almost any system there is an interdependence between its components. The greater the interdependence of these components, the greater the need for effective communications and cooperation between them.

Deming infers that business is analogous to an organized team, such as a sports team. A sports team, in order to be successful, must function cohesively as one entity with each component supporting the other component's efforts. In order to be successful and win, a sports team's members (components) must play as one unit with an established goal. If one member starts to act independently, his team will suffer. This would be a classical example of a system that has become sub-optimized due to the deadly disease known as striving for independent short term goals.

The performance of any component is to be judged in terms of its contribution to the aim of the system, not for its individual production or profit, nor for any other competitive measure. Some components may operate at a loss to themselves for the optimization of the whole system. [Ref. 11: p 15]

The Allied Forces' execution of Operation Desert Storm in their 1991 war with Iraq, further exemplified this principle. The underlying premise that came out of this conflict, was that no one weapon or service wins wars, but winning is a collective effort by all. It does not matter that one element of our force accounted for 90% of the enemy losses, because if the other elements were not there, the 90% could not have been achieved.

Just as a sports team has a manager, Government and industry have individuals who manage and orchestrate the various components of their organizations (systems). According to Deming, a system must be guided by external sources (e.g., management) in order to achieve system optimization. The assumption underlying this approach is that management cannot anticipate all future problems and prepare solutions for them ahead of time. The manager's role as a leader is to evaluate and deal with the system adjusting it as required, to try to bring it as close to the point of optimization that it is capable of as a system, and then stay there. [Ref. 3] The Taguchi loss function implies that a system needs to strive to the point of optimization for that system. There is an understanding that the point of optimization may never fully be attainable or maintainable because of the external influences acting upon the system. Figure 1 reflects this concept with the sports team example: [Ref. 4:p 4]



The Taguchi Loss Function

Figure 1

Applying the Taguchi Loss function in this example, a sports team's success would be a function of the team's performance as a cohesive unit.

The characteristic being measured in this case would be the success of the sports team in its environment. This measurement in turn would be effected by the ability of the team to work together.

This implies that the management of a system requires "knowledge" of the interrelationships between all of the components within the system and of the people that work in the system. In TQM, optimization of a system implies the achievement of the "aim". "Without an aim, there can be no system." [Ref. 6]. Systems are complex to manage, because they are constantly undergoing changes over time, such as growth in size. It is the responsibility of management to coordinate and direct the efforts of the system's components through these changes. This leads to a fundamental management theorem necessary for the implementation of successful corporate strategies; that it is vital for management to be able to recognize when the boundaries of the system change and be able to adapt to continue supporting the organization.

If the aim, size, or boundary of the organization changes, then the functions of the components will for optimization of the new system change. Time will bring changes that must be managed to achieve optimization. [Ref. 10:p 14]

2. Theory of Variation

TQM stresses that it is the role of management to manage these "unknowable" changes. Deming emphasizes, that in principle, the components of a system could under stable conditions manage themselves to accomplish their system's aim. However, most systems are influenced by external forces as well as internal forces. When and how these forces will impact the system is unknown, but it is management's role as a leader to manage these unknowable forces, if the system is to be optimized.

a. What is a stable system?

A stable system is a system that has an established environment and defined components. Fluctuations within this system will occur but they are purely random in nature, and are referred to as common causes. Every stable system will have

fluctuations in it due to common causes. They are inherent in the system. Special cause on the other hand, will cause a system to operate in an unstable manner. A stable system by definition has had all of the special causes of variation eliminated. An example utilized at the Deming Seminar to depict this principle, is absenteeism. Absenteeism, a common Government concern, may display the characteristics of a stable system if absentees are within certain expected parameters over time. Special causes influence changes to the expected absentee rates that are above or below what would normally be expected. If a stable system exists, only management can improve the optimization of that system [Ref. 12 p 325]. If the overall system is not improved or changed, the "common causes" which are inherent to the existing system will remain because they are systematic in nature.

3. Theory of Knowledge

The theory of knowledge is designed to help us understand that management in any form is prediction. Management of a system is action based on prediction. "Rational prediction requires systematic learning and comparison of predictions of short-term and long-term results from possible alternative courses of action." [Ref. 10 p 12]. Management acts on changes to and in the system, as well as the unknown factors influencing those changes. It is the role of management to manage these unknown factors.

When dealing with these changes (causes), management faces making two major mistakes: [Ref. 12 p 318/Ref. 6]

a. *Mistake 1.*

To treat any problem, outcome, fault, complaint, mistake, breakdown, accident, or shortage as a special cause when it actually came from common causes (tampering)

b. Mistake 2.

To attribute a problem, outcome, fault, complaint, mistake, breakdown, accident, or shortage as a common cause of the system when it actually came from a special cause

Over-adjustment is a common reaction to mistake No. 1. Never doing anything to try to find a special cause is a common reaction of mistake No. 2

These mistakes commonly occur because the managers involved made their evaluations based solely on their past experiences. The results will not lead to an improved system only one that has been "tampered" with. This in turn will lead to a change in the system and the creation of new common causes which will remain unknown until they occur. Then they will have to be correctly identified as such or the same type of tampering reaction will probably occur again

Deming states, "There is no hope to avoid both mistakes all the time." If management conscientiously attempts to avoid making one of the above mistakes, it will then as a consequence, commit the other one as often as possible. [Ref. 12:p 319] Furthermore, the action required to find and eliminate a special cause is totally different from the action required to improve the process to correct common causes. If management adjusts a stable system to try to compensate for a result which they deem is undesirable, the result which follows will be worse than if management had completely left the system alone. "What is required for improvement of a system is a fundamental change in the system not just tampering." [Ref. 12:p 327] Common causes can never be eliminated, they will always be inherent to the system. Management's understanding of the system of Profound Knowledge involves management's acknowledgement that "experience without theory teaches us nothing." [Ref. 12:p 317] Conversely, there can be no understanding of a system if theory is applied without experience. [Ref. 11:p 10]

4. Knowledge of Psychology

Psychology helps us understand people, interaction between people, and their behavior. Traditionally, management in industry, Government, and education, have operated under the supposition that all people are alike. In Deming's System of Profound Knowledge, the component "Knowledge of Psychology" is his attempt to help management understand the complexities of human behavior. Specifically, as human behavior applies to the motivational values of individuals, both intrinsically and extrinsically. Deming as well as many behavioral theorists, believe that the individual is born with an innate intrinsic need for self-esteem and respect. Where as, the individual's extrinsic needs are the by product of the environment around him.

[Ref. 11:p 9]

In order for management to be effective in their leadership role, they must understand the difference between the two needs and how they serve to motivate or demotivate the individual. An understanding of these motivators is vital before management can make improved changes to the system. People are part of the system and not all people react in the same manner to the same stimuli. Removal of a demotivator from a system will not necessarily create a motivator towards a desired behavior or improved system. [Ref. 11:p 22] Conversely, Deming views the use of extrinsic motivators as barriers to fully grasping the concept of profound knowledge as well as a barrier to achieving full optimization of a system. [Ref. 11:p 24] Understanding the concept and value of intrinsic motivation is vital to establishing the basic foundation necessary to grasp the essence of the theory of profound knowledge.

To effectively promote management's role as a leader, management must strive to remove what Deming refers to as the Forces of Destruction of Intrinsic Motivation: [Ref. 11:p 26]

1. Grades in School-Gold Stars for Athletics;
2. Merit System. Judge people; put them into slots. Encourage competition between people, groups, divisions;
3. Incentive Pay. Pay for Performance;
4. M.B.O. and management by the numbers;
5. Business plans with reports on monthly or quarterly targets;
6. Quotas for production, daily or weekly;
7. Suboptimization. Demanding that every group, every division, show a profit.

Deming stresses in his lectures that it is not just enough for management to remove these "forces of destruction", they must also replace them with what is critically needed; leadership.

These forces rob people, and the nation, of innovation and applied science. We must replace these forces with leadership that will restore the power of the individual. [Ref. 11:p 26]

a. Holistic Thinking Versus Analytic Thinking

At the beginning of this chapter, the concepts of "Holistic" and "Analytic" thinking were discussed in conjunction with the cultural backgrounds of the United States and Japan. These two concepts are compared in Table 1 as they apply to the analytical American style of management and the holistic Japanese management philosophy. [Ref. 3]

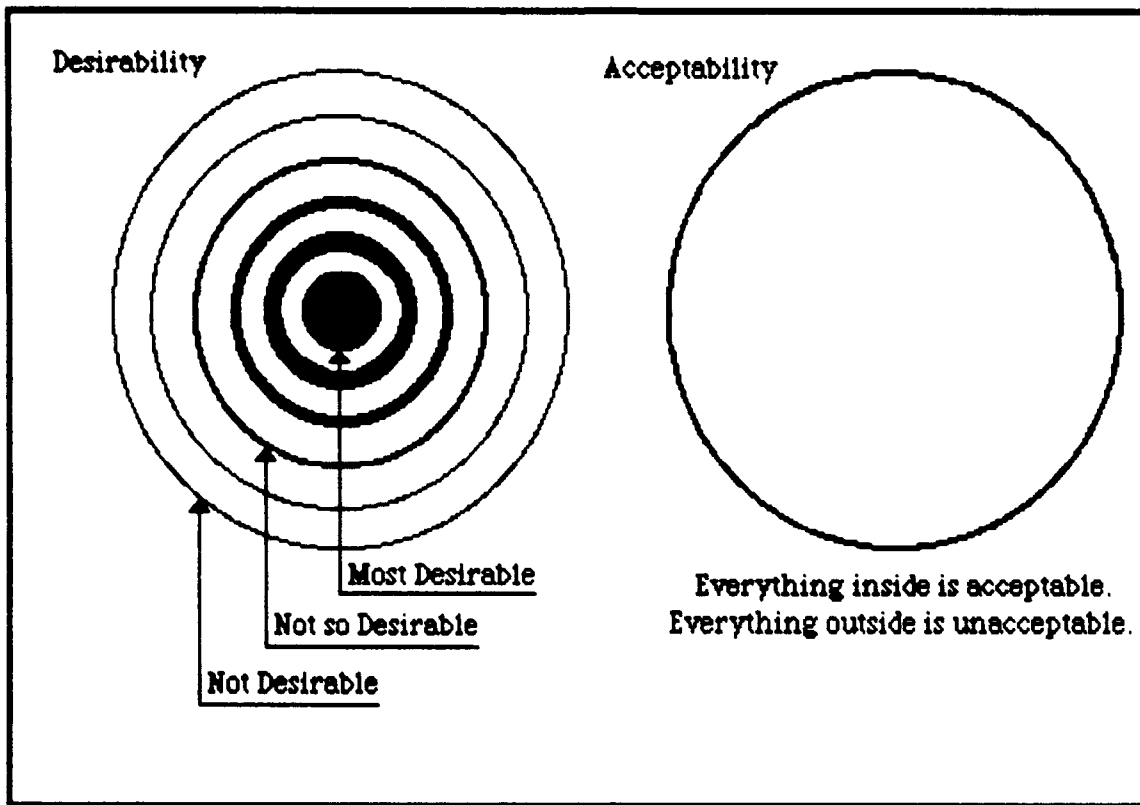
Analytical Versus Holistic Thinking

Table 1

<u>Analytic Thinking</u>	<u>Holistic Thinking</u>
Individual parts are separate	Total is more than the parts
Competition	Cooperation
Acceptability	Desirability
Specification limits	Taguchi Loss Function targets
Zero Defects	Continuous Improvement
Ranking	System variation control
Secret design	Team design
No specific purpose	Corporate constancy of purpose
Short term goals	Long term vision
Management by Objectives	Deming's Fourteen Points
Job hopping (lack of loyalty)	Permanent commitment

Understanding the differences between the corporate management techniques of the U.S. and Japan, can provide a basis for the understanding of the concepts of desirability (holistic thinking) versus acceptability (analytic thinking).

Figure 2 graphically compares the two. [Ref. 5:p 3]



Desirable Versus Acceptable

Figure 2

Japanese management because of its unified value system, tends to fill in the center first, establishing what is desirable. American management because of the diversity of our population, culture, and value systems has developed an acceptability concept. This concept tends to define perimeters or boundaries which serve to separate what is acceptable, from what is not. The problem here is that once ridged boundaries are established, people will naturally tend to gravitate towards meeting the lower requirements of acceptability rather than striving to achieve the more exacting ones of desirability. [Ref. 3]

The traditional American analytic style of management evolved from management practices which have been credited with establishing America's dominance in the twentieth century. Deming however, after acknowledging this

belief, has also stated that these same practices which led to America's prominence in the past have become "the walls of our prison" in the present. [Ref. 6] Examples of these walls are as follows: [Ref. 6]

1. Strategic Short Term planning vice Strategic Long Term planning;
2. Ranking of individuals (ranking leads to conflict and competition);
3. Management by Objectives (treating the symptoms instead of the causes);
4. Treating common causes as special causes (tampering);
5. The use of standards and work quotas;
6. Management by the numbers (I don't care how you do it! Just do it!)

Deming stresses that transformation is required in our society, Government, education, and industry. Managers as leaders today, must recognize that our management process is currently in a stable system. In order to move out of our current state, action must be directed to bring about a change. In pursuing change we will always have to deal with crisis type problems, "but these activities do not change the system." [Ref. 6] In order to promote the effective change of the system, a manager today must understand the system of profound knowledge.

A leader of today must understand the limitations of the old theories and the practices of management that these theories led to. A leader of today must adopt a theory for today's world and must develop an appropriate system for the management of his theory. The theory that he requires is knowledge about the system and the optimization thereof. [Ref. 6]

D. SUMMARY

Deming's management philosophy should not be confused as a directed step by step procedure designed to solve management's problems. Deming's management philosophy presents as its foundation, principles that are designed to provide guidance as well as promote intellectual thought on the system of management. TQM provides a

method with which to question why things are the way they are, as well as a philosophy for evaluating the way things could possibly be. The reader must recognize that the success of TQM in the Japanese society cannot be understood without an understanding of the Japanese environment. Management in America cannot expect the principles of TQM to work in our society by imitating how the Japanese applied the principles to their society. America, its culture and its values, have evolved from a different environment and history. This does not however preclude us from utilizing Deming's principles of thought and adapting them to our society and culture. As Deming states:

Theory leads to questions. Without questions, experience and examples teach nothing. To copy an example of success, without understanding it with the aid of theory, may lead to disaster. [Ref. 6]

Deming's TQM philosophy can be applied to any system that has a product and a customer. With regard to DoD and Government service, Deming states:

In most governmental services, there is no market to capture. In place of capture of the market, a governmental agency should deliver economically their service prescribed by law or regulation. The aim should be distinction in service. Continual improvement in Government service would earn appreciation of the American public and would hold jobs in the service, and help industry to create more jobs. [Ref. 1 2: p 6]

We as managers (DoD and Government), can adopt aspects of Deming's Management Principles to formulate our own fundamental management philosophy. However, as Dr. Yoshida and Dr. Deming stress, before America can successfully implement the principles of TQM, management must first adopt the broad concept of holistic thinking. [Ref. 6] What is required here is for us to see the big picture, and not just the portion in front of our faces.

III. BACKGROUND

A. INTRODUCTION

This chapter will provide the reader with a background into the evolution of the Competition in Contracting Act (CICA) of 1984 and the Defense Industrial Base. The purpose of this chapter, is to establish for the reader the environment in which the defense industry must operate in.

B. THE DEFENSE INDUSTRIAL BASE

1. National Security Strategy

Since World War II, the national security strategy has contributed to a decline in U.S. industrial responsiveness. Prior to 1980, Industrial Base Program Planning (IBPP) played a limited wartime role. The existing DoD's consolidated guidance was based on a "short war", which would not involve expanding industrial production. [Ref. 13:p 2] After the Korean War, the United States shifted to a strategy and force posture that relied heavily on nuclear superiority to deter war. [Ref. 14:p 9] Six-day nuclear exchanges or battles fought over 12 to 18 weeks would gain little from economic preparedness. The war would be over before industry could respond. It was not until the Soviet Union was perceived as a permanent enemy who was beginning to achieve nuclear parity as well as a large conventional military force, that a security strategy based on nuclear deterrence was questioned.

During the early sixties, the Cuban Missile Crisis provided an insight for our executive leaders that reliance on nuclear superiority alone was inadequate in terms of responding to all varieties of crisis situations.

Even though the United States possessed apparent nuclear superiority over the Soviet Union. President John F. Kennedy remained reluctant to utilize this superiority. President Kennedy recognized that even though the Soviets possessed only minimal nuclear capability, that capability was sufficient to inflict unacceptable levels of

devastation on the American nation. Ultimately a peaceful settlement was reached, however, the crisis only served to intensify the Soviet resolve to achieve both nuclear and conventional force superiority. An American nuclear response to a Soviet conventional attack was becoming a less credible deterrent to war. The United States, as a result, adopted a strategy of "flexible response". This strategy called for "responding to conventional aggression with conventional weapons while maintaining nuclear weapons as a deterrent to nuclear attack and for "first use" options if conventional defenses failed. [Ref. 14:p 9]

2. A Change in Strategy

The shift to a strategy of flexible response required that the United States establish and maintain a large peacetime conventional military capability to deter Soviet aggression. In order to implement this strategy, the U.S. needed to bolster its existing non-nuclear forces, and improve its industrial base rapidly and effectively to augment our conventional forces in times of crisis. Improving industrial responsiveness requires money. With the limited resources available for acquisition, short term objectives often outweighed the long term pursuit of improving industrial responsiveness. Consequently, the administrations during the 60's and 70's were very reluctant to take significant steps in this area. "The result was a national security goal that was not matched by a corresponding industrial capability". [Ref. 15:p 10]

a. Defense Guidances

During the 1980's, a major change in defense planning occurred with the publication of the 1983-1987, and 1984-1988 Defense Guidances (DG). These DG's included consideration for a global conflict of indefinite duration. [Ref. 14 :p 3] Industrial mobilization is commonly credited for our victories in World War I and II, less important in the Korean conflict and of no significance in our more recent military activities. [Ref. 16:p 2] With the new premise that the next world military

crisis would probably not involve a clash of nuclear weapons, the defense industrial bases' ability to expand production became an important factor in the Department of Defense planning to provide our nation the capacity to deter or engage in conventional warfare of long duration. Planning for this contingency, therefore, became paramount. [Ref. 16:p 5]

The following terms and definitions are provided for reference;

1. **Industrial Mobilization:** The expansion and transformation of a peacetime industry to an industrial program that can support the Nation's military objectives. (A declaration of a national emergency by the President is required before industry can be directed to mobilize). [Ref. 13:p 22]
2. **Surge Economy:** The acceleration of military production for selected items using existing facilities in peacetime, which can begin without declaration of a national emergency. [Ref. 13:p 22]

C. EVOLUTION OF THE DEFENSE INDUSTRY

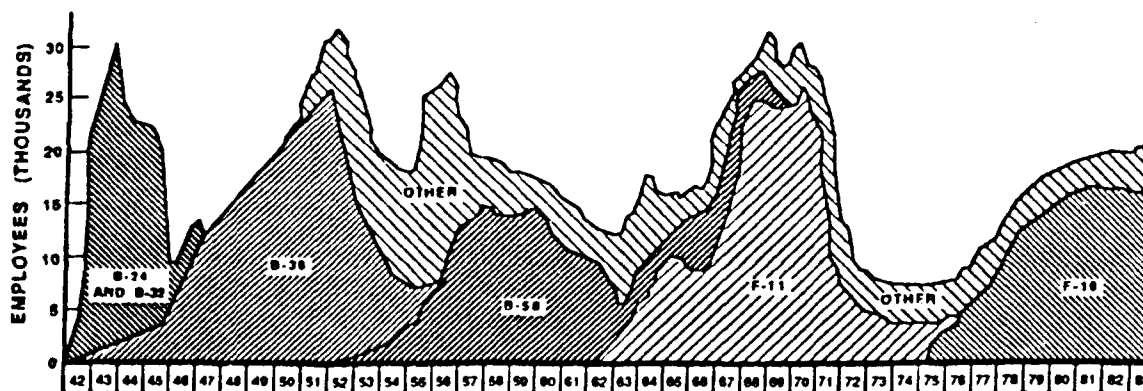
The evolution of the defense industry must be viewed as an entity that did not evolve overnight but was developed over time. Noted author, Jacques S. Gansler has identified several significant features that help to describe the present defense industrial environment. Many of these features have been shaped over a long period of time, often without any planning or guidance and, as a result, seem to have contributed to many of the current problems now facing the defense industry. A clear understanding of these characteristics by the reader will help assist with future corrective actions. These characteristics are listed below and will be addressed:

1. The extremely cyclical nature of defense procurements;
2. The lack of structural planning;
3. The inadequacy of industrial preparedness planning and industrial readiness;
4. The importance of technology and research in defense;
5. The difference among the industries that make up the defense industrial base;
6. The high concentration within industrial sectors. [Ref. 15:p 240-242]

1. Cyclical Nature

The cyclical nature of the defense industry has existed since 1776. In times of national crisis, defense expenditures have been increased to meet a national security threat only to have these same expenditures rapidly reduced once the threat had been met and neutralized. As a result, after each crisis, the same defense industry which produced the materials with which our nation faced each crisis was given little regard and more often than not disappeared. "Yet planning in defense is traditionally based upon the assumption of relatively constant defense expenditures." [Ref. 15:p 241]

During the past 50 years, the defense industry has gone through roughly four major buildup and drawdown phases, centering and peaking around major world events. [Ref. 15:p 248] An example of these cycles are displayed in Figure 3 which represents the employment history of Air Force Defense Plant 4, located in Fort Worth, Texas. This plant has been producing front line military aircraft for the U.S. Air Force since 1942. This figure taken from Jacques Ganzler's book *Affording Defense*, is not at all atypical of defense plants in general, from shipyards through aerospace manufacturing facilities.



Employment History of Air Force Defense Plant 4

Figure 3

The last cycle on Figure 3, reached its peak in 1986, and since 1987 has displayed a steady and downward trend. Based on past trends, this downturn will probably not bottom out until around 1995. Each one of the above cycles began with a large investment in defense spending in response to a perceived threat or an international crisis. Each buildup was also abruptly followed by a steady and rapid decline/disinvestment of federal expenditures once the threat was no longer perceived to be of immediate or significant consequence. [Ref. 17]

2. Structural Planning

A lack of formalized structural planning has existed since the beginning of industrialization. This lack of planning has left the evolution of the defense industrial base largely to chance. Until recently, it was believed that "free market" forces would promote the desired structural characteristics where competition would provide the motivation for firms to produce quality products at a reasonable cost and in a timely manner. It was assumed that capital markets would ensure that an adequate number of producers would be maintained without Government intervention. Unfortunately the "free market" in the defense industry has not worked as "desired".

The following definitions are provided for clarification:

1. **Market:** Is defined as an area over which buyers and sellers negotiate the exchange of a well defined commodity;
2. **Free Market:** Is defined to be an economy in which the decisions of individual households and firms (as distinct from the central authorities) exert the major influence over the supply and demand allocation of resources. [Ref. 18:p 62]

As a result, it seemed many politicians attempted to tinker with the "system" to make it work the way they believed it should. These individuals attempted to correct the problems as they perceived them through a voluminous series of laws and regulations which appear to have been created with conflicting objectives.

3. Industrial Preparedness

It appears the inadequacy of industrial preparedness planning is due to the absence of adequate peacetime planning. Industrial preparedness has been traditionally a reaction to a national crisis. In the past, our military forces relied on simplistic weaponry resembling commercial equipment to promote our national defense. Today our military forces abound with highly complex and technologically advanced weapons requiring years to build and months for our soldiers to learn how to adequately operate. The lead times for military conflicts have been greatly reduced, due to the advent of aircraft and intercontinental ballistic missiles. Consequently, the lead time allowable for surge and mobilization efforts has been dramatically reduced due to the long lead time and expense required to build the sophisticated weapons of today.

4. Technology and Research

To develop and promote a national strategy, the DoD throughout its history has placed a premium on its dependence of advanced technologies to establish and provide its dominant military posture. This reliance on advanced technologies has, in turn, prompted the defense industrial base to continuously invest in research and development programs to meet and fulfill this need. As a result of this emphasis, many industrial projects for DoD weapons systems were designed and developed with extravagant performance characteristics without regard to cost.

5. Industrial Differences

Differences among the industries that make up the defense industrial base have not been acknowledged. Congress insists upon uniform procurement practices across all sectors. These uniform procurement practices and their associated uniform profit policies ignore the inherent differences in the percentage of Government ownership and influence in different sectors. Sectors that are exclusively defense orientated are treated the same as sectors that have commercial applications. The high

concentration within certain industrial sectors has been fostered by the rapid buildup and sell-off associated with the cyclical nature of the federal defense expenditures. The complex nature and the excessive capital equipment costs of modern technology have also further contributed to this concentration.

D. THE ROLE OF CONGRESS

The Constitution gives Congress three principle roles in connection with national security: the power to declare war, the power to appropriate money for defense, and the duty to oversee the Federal acquisition practices. [Ref. 15:p 107]

Congress, through the constitution, has been mandated the responsibility to allocate the financial resources of the federal Government. To fulfill its duties Congress has come up with three formal processes which facilitate this task: the authorization, appropriation, and budget processes. The authorization process establishes federal tax laws and creates federal programs to respond to national needs. The appropriation process, through congressional committees, funds the programs that are created/established via the authorization process. The budget process establishes annual fiscal policy to determine the amount of total spending and revenues, and how the total spending will be divided among the major functions of Government such as agriculture, defense, health, and so forth. Unlike the authorization and appropriation processes, which focus on federal programs individually, the budget process focuses on the federal budget as a whole and how it effects the national economy.

E. DEFICIT REDUCTION ACT

On July 18, 1984, President Reagan signed into law the Deficit Reduction Act, Public Law 98-369. [Ref. 19] Included as title VII of the Deficit Reduction Act, was what is known today as the Competition in Contracting Act of 1984. [Ref. 19] When the Competition in Contracting Act went into effect on 1 April 1985, it became the most

broad sweeping change in the manner in which the United States Government conducted its procurement practices since the incorporation of the Armed Services Procurement Act of 1947.

1. Armed Services Procurement Act of 1947

The Armed Services Procurement Act of 1947 was passed into law by Congress in an attempt to establish a unified set of regulations that would consolidate and reconcile the multitude of military service regulations that had been generated during World War II.

During World War II, the United States Government "liberalized" its procurement regulations to effectively prosecute its war with the Axis powers of Germany, Italy, and Japan. After the cessation of hostilities, the United States was confronted with its new role as a dominant world power. To support this new role, the United States military was destined to remain at roughly ten times its prewar size. However, the existing prewar federal procurement legislation could not support the post war military requirements. The Armed Services Act was formulated to bridge this gap and accomplish two major objectives:

1. Consolidate existing service regulations and establish workable procurement policies for the U.S. Government which could be implemented during times of national emergencies.
2. Recognize that "negotiated procurements" were to be the required method of procurement in peacetime as well as wartime. [Ref. 20:p 646]

2. Terms and Definitions

With the passage of the Competition in Contracting Act of 1984, and the numerous other amendments to existing defense bills, Congress aggressively applied pressure on the DoD to devote significantly more attention and personnel resources towards the competitive effort in all future DoD procurements.

The following terms and definitions as utilized in the Competition in Contracting Act of 1984, are provided for reference:

1. **Full and Open Competition:** To mean that all responsible sources are permitted to submit sealed bids or competitive proposals;
2. **Competitive Procedures:** To mean the procedures under which an agency enters into a contract pursuant to full and open competition;
3. **Responsible source:** To mean a prospective contractor who is capable of satisfying the agency's needs, considering resources, delivery of performance schedule, performance record, integrity and business ethics, organization and experience, equipment and facilities, and any other qualifications." [Ref. 19:p 1432]

F. CONGRESSIONAL JUSTIFICATION FOR CICA

During the 1950's and 1960's, the defense budget consumed approximately 40-50% of the federal budget. With the termination of the Vietnam War and the resulting large reduction of the military services, a greater proportion of the federal budget began to be consumed by Congress' desire to expand the entitlement programs (Social Security, Medicare, Medicaid and retirement benefits for federal employees). [Ref. 15:p 79]

One of the major factors leading up to the formulation and passage of the Competition in Contracting Act by the United States Congress was its members' growing belief that Federal Procurement dollars (loyal constituents' hard earned tax dollars), were not being spent wisely by the existing DoD acquisition process. With the national debt increasing to record levels each fiscal year, Congress recognized that it had to take some form of action.

The opportunity arose during the early 1980's, when America witnessed the largest military buildup and modernization of its armed forces that was ever conducted during a peacetime economy. It was in the wake of this huge military buildup that the public became increasingly wary of the Department of Defense's procurement practices. The deficit budget was at a record high level, and the media was focusing on soaring weapons procurement costs, pricing scandals, and images of crooked defense contractors. The public began believing that the DoD's procurement practices were out

of control, its officials inept and all defense contractors crooks. In reaction to this public dismay, the United States Congress mandated that competition would be the watchword in all future DoD procurement practices (via the Competition in Contracting Act of 1984). [Ref. 1:p 118]

1. Congressional Intent

As a direct result of the CICA, the DoD was forced to restructure its procurement practices from emphasizing the methods of procurement to emphasizing the use of competition. Prior to CICA, the existing acquisition statutes favored the use of the "formal advertising" method over the negotiated method. [Ref. 21:p 1] With the passage of CICA, the new statutes strongly favored procurement from multiple sources instead of from a sole source. Congress' intent in passing CICA, was to foster full and open competition, remove preference for sealed bids, curb cost growth, promote cost savings, technical innovation, and fair play. [Ref. 22:p 1422] Each member of congress saw this as a positive step towards ensuring that the procurement process was open to all capable contractors (constituents) from his or her district.

To enhance the competition effort, CICA authorized the services to "establish or maintain an alternative source or sources of supply for a particular property or service by using competitive procedures to allow all sources to compete while excluding the incumbent contractor from competition." [Ref. 22:p 1424] To prevent any misuse of this authority, Congress further clarified the following three guidelines under which this "dual sourcing" authority could be utilized:

1. To increase or maintain competition which would likely reduce overall costs;
2. It is in the best interest of national defense in case of a national emergency or industrial mobilization;
3. It is in the interest of national defense in establishing or maintaining an essential engineering, research, or development capability. [Ref. 22:p 1424]

2. Socio-economic Content

To further promote the socio-economic content and impact of set-aside programs for their small business orientated constituents, the members of congress encouraged and "authorized the Government agencies (e.g., DoD) to limit competition to small business concerns or socially and economically disadvantaged small business concerns." [Ref. 22:p 1424] These above stipulations were all designed to redirect the DoD away from the utilization of sole source procurement practices. To clarify when sole source contracts would be permitted by Congress, CICA provided the following seven exceptions under which "procedures other than competitive procedures" would be allowed:

1. The property or services needed by the executive agency are available from only one responsible source and no other type of property or services will satisfy the needs of the executive agency;
2. The executive agency's need for the property or services is of such an unusual and compelling urgency that the Government would be seriously injured unless the agency is permitted to limit the number of sources from which it solicits bids or proposals;
3. It is necessary to award the contract to a particular source or sources in order to (A) maintain a facility, producer, manufacturer, or other supplier available for furnishing property or services in case of a national emergency or to achieve industrial mobilization, or (B) establish or maintain an essential engineering, research, or development capability to be provided by an educational or other nonprofit institution or a federally funded research and development center;
4. The terms of an international agreement or treaty between the United States Government and a foreign Government or international organization, or the written directions of a foreign Government reimbursing the executive agency for the cost of the procurement of the property or services for such Government have the effect of requiring the use of procedures other than competitive procedures;
5. A statute expressly authorizes or requires that the procurement be made through another executive agency or from a specified source, or the agency's need is for a brand-name commercial item for authorized resale;
6. The unrestricted disclosure of the executive agency's needs would compromise the national security unless the agency is permitted to limit the number of sources from which it solicits bids or proposals; or

7. The head of the executive agency

- a. Determines that it is necessary in the public interest to use procedures other than competitive procedures in the particular procurement concerned, and;
- b. Notifies each House of Congress in writing of such determination not less than 30 days before the award of the contract. [Ref. 19]

G. CICA IMPLEMENTATION

To strengthen the procurement process within each agency, the Congress stipulated in CICA that "the position of advocate for competition with responsibilities for promoting competition in the agency's procurement process" would be established. [Ref. 22:p 1433] Each agency was then directed to "establish policies, procedures, and practices necessary to ensure that a sufficient number of sealed bids or competitive proposals were received from responsible sources to fulfill the government's requirements at the lowest reasonable cost. [Ref. 22:p 1434]

To ensure that a strong enforcement mechanism was in place to monitor the competitive process in the public sector, Congress established the procedures for industry to monitor competition through establishment of the Procurement Protest System. This system provided the means for contractors who believed that they had been wrongly excluded from competing on a Government contract to voice their concern in the form of a protest. The key language of this policy is as follows:

Any actual or prospective bidder or offer or whose direct economic interest would be affected by the award of or failure to award a procurement contract by an executive agency may challenge the agency's solicitation, award or proposed award by filing a protest with the Comptroller General. [Ref. 22:p 1435]

The result was that for the price of a stamp, Congress via CICA had provided a means (that did not and still doesn't exist in the commercial sector) by which losers of Government competitions were given "the right not only to protest but also to hold up the procurement until the protest is ruled on". [Ref. 15:p 191]

1. Competitive Effort

CICA directed that required agencies:

Establish policies, procedures, and practices necessary to ensure that a sufficient number of sealed bids or competitive proposals are received from responsible sources to fulfill the governments' requirements at the lowest reasonable cost. [Ref. 22:p 1434]

One of the methods utilized by DoD to promote competition was "dual sourcing". The DoD attempted to use dual sourcing to gain improvements in quality and reductions in cost. In principle, dual sourcing involves locating a second contractor to produce the same product simultaneously with the original vendor. It is usually pursued once a design has been proven sound, and the two contractors share the production requirements each year based on their respective offers.

If existing demand is insufficient to support a multiple number of contractors, then splitting the existing production requirements between contractors reduces economies of scale. This established economic theory states that as the size of the production requirement becomes larger and more long term in nature, the economical efficiency of the production effort will also increase resulting in lower production costs. This occurs as a result of improved utilization of machines, people, and procurement of economic quantities of raw resources. As the maturity or production duration and size increase, the manufacturer's workers become more proficient and familiar with their job taskings. Fewer hours are required to produce the same product, thus lowering costs. This is referred to as the learning curve. Conversely, simple economies of scale dictate that the smaller the number of units purchased, the larger the share of fixed costs and indirect expenses each must carry. This drives up the unit price. Therefore, on programs where the volume is relatively small and the manufacturing is very capital and labor intensive it would seem that a sole source monopoly might be justified.

A typical manufacturing line will possess an optimum as well as a minimum and maximum "economically efficient production rate". Beyond this rate, it becomes uneconomical to produce an item because its associated costs are too high. However, during the Reagan buildup (1983-1987), the Congressional Budget Office (CBO) found that half of the 40 largest weapons programs were purchasing weapons in numbers below the figures required for minimum economical efficiency production rates. For example, the minimum rate of economical production of the Air Forces' F-15 fighter is 120 planes per year. However, the DoD was only buying F-15s at a rate of 41 per year. [Ref. 15:p 177]

The concern of Congress has been that in the standard sole-source environment of the defense industry, there is very little incentive for contractors to control costs. There is, in fact, a very high incentive for them to maintain or even escalate their costs. The Government pursues contract negotiations based on the preceding year's actual costs. As a result, it appears that many sole source producers seem to have progressed through a relatively flat learning curve.

In theory when the dual sourcing concept is introduced, it changes the whole environment of the acquisition process by placing the Government in a very powerful buyers position (monopsony). The two sources now compete as oligopoly suppliers. Numerous Government analyses have shown that in programs where the second source has been a high quality producer the learning curve of the second source has been significantly steeper than the first source. When the second source's costs have been reduced below those of the first source, the first source has reacted by lowering its

costs, and both sources go down the steeper learning curve (see Figure 4). For the dual sourcing concept to be effective the following criteria must first be met:

1. The production quantities must be significant enough for both sources to recognize economical production efficiency rates,
2. Both sources must be competent high quality producers, and
3. The production process must possess sufficient labor content.

When these criteria are met, the dual sourcing method has had average program cost savings of between 12-30% as well as improved product reliability. [Ref. 15:p 187]

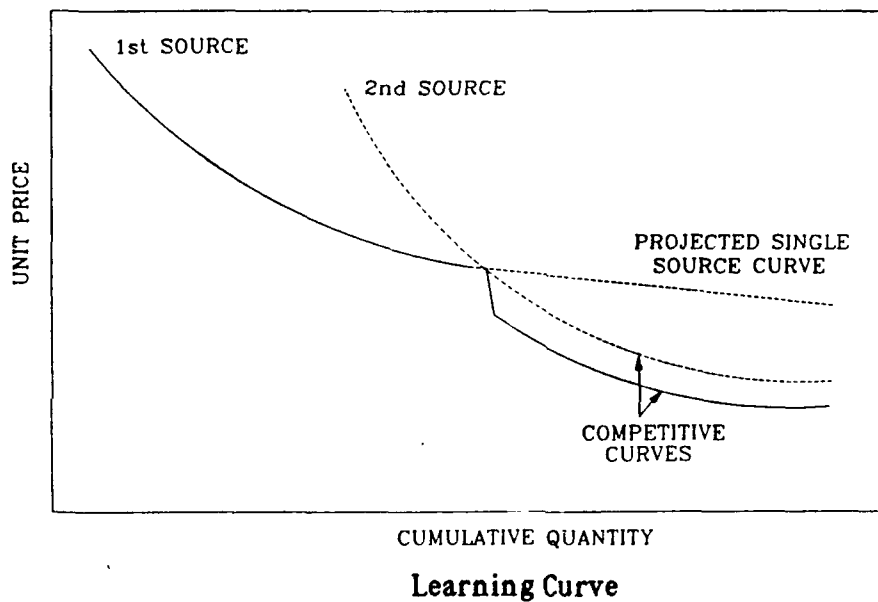


Figure 4

It seems that supporting two production sources without sufficient demand to economically justify their existence would become very costly, both for the customer and the manufacturer. Professor D. Yoshida, a leading TQM expert, has stated that one of the major problems with today's competitive effort is that "competition within the same industry leads to the waste of scarce resources by duplicated research performed in various companies without any coordination." [Ref. 23] The TQM philosophy, it would seem, would label this type of behavior within the defense industry as pure inefficiency, resulting in higher costs both for the manufacturers and the customers.

H. CICA AND THE PROTEST PROCESS

Everett Pyatt directed that in the source selection process, cost would carry a minimum evaluation weight of 40%. [Ref. 24:p 1] Up to this point in time, personnel in DoD may have been confused by other Congressional language in CICA that stipulated contracts could also be awarded on the basis of best value. CICA stated that another evaluation criteria, such as quality, may be the dominant factor, and cost may be the secondary factor in source selection procedures. [Ref. 22:p 1438] Initially, the DoD pursued contract awards based on perceived best value and not solely on lowest cost. However, due to the substantially revised protest procedures also incorporated in CICA, more emphasis began to be placed on cost rather than best value. The new protest procedures stated:

Any actual or perspective bidder or offer or whose direct economic interest would be affected by award or failure to award a contract may challenge the agency's solicitation, award, or proposed award by filling a protest with the Comptroller General. [Ref. 25:p 4]

It appears that due to the apparent and obvious *judgmental* nature of determining best value, it became tough and sometimes impossible to justify it during a protest litigation. Lowest cost is easier to defend during the source selection process, because it involves hard numerical data which can be readily measured.

I. CONGRESS AS OVERSEERS

From their behavior and actions, it appears that Congress perceives itself to be inherently a better manager of the public's interest than any other component of the Government. Of late, it seems that Congress has perceived its role as establishing detailed control systems for the lower levels of management to operate by.

As a result, Congress has reacted strongly to its lack of confidence in the Defense Acquisition System (DAS). The recent policy initiatives have focused almost exclusively on specific deficiencies and operating problems (special or common causes) in the DAS. The thrust of these initiatives, driven by CICA, have been to increase the level of

competitive awards, reduce the price paid for weapons systems and services and enhance the ethical integrity of the system.

Former Secretary of Defense, Casper Weinberger, responded to Congress' reaction to some of these so called specific deficiencies:

These individual horror stories must be put in perspective and should not be extrapolated to indict the entire defense acquisition process. [Ref. 26:p A1]

Harvey Gorden, former Assistant Deputy Under Secretary of Defense for Acquisition also commented:

It is ironic that never before has the DoD done as good a job as it is doing now, yet there is a growing perception that things are getting worse not better. [Ref. 27:p 252]

Retired Air Force General Earl O'Loughin, former commander of the Air Force Logistics Command (AFLC) stated:

Even if we were "Ivory Soap" pure- that is 99 44/100% pure, that would still leave us with a potential 560 horror stories per year, since we price 100,000 items per year. [Ref. 28:p 2]

According to Deming, the DAS is acting in a stable manner. Congress and DoD should be pleased with its performance considering the volume of administrative paperwork and contracts processed. The system will never reach 100% optimization (0 horror stories), and no one should expect it to.

Congress' legislative actions are tampering with the system. They are reactionary in nature and based on occurrences of the past. These occurrences are no indications of what will occur in the future unless they are properly analyzed. They can only serve as a tool for management to predict what can occur in the future, not what will occur. Congress reacts to causes in the system, which is good. Unfortunately, is that they do not try to determine if the causes are special one time, never to occur again, or common ones which are part of the system.

A majority of the legislation has been in reaction to specific occurrences of poor management or wrong doing. It is intended directly to ensure that these occurrences

will never happen again. Typically these remedial actions have not been evaluated for soundness and feasibility of implementation, nor have they been subsequently evaluated to determine their overall impact on the DAS as a whole. TQM would label this type of behavior as tampering. If the system is not producing the desired outcome, then change the system. The answer is not to add more rules or regulations to isolate specific occurrences, because this will not correct or remove the causes.

To operate efficiently, the Defense Industrial Base and DoD should be allowed sufficient flexibility to execute the DAS along sound business principles. With the existing single year budgetary authorization and appropriation process, this course of action is not a viable option. With Congress unwilling to progress to multi- year budgeting, business corporations, as well as the DoD, find themselves frequently in a very unstable funding environment. Congress' current trend of manipulating the defense budget from year to year has made it very difficult if not impossible to effectively plan on a long term scale. This emphasis according to TQM, is very short sighted and short term orientated. This is one of the Deming's deadly diseases that must be overcome before any system can achieve optimization. Single year budgets lead to inefficiency and confusion both within DoD and industry. Instability in the private sector induces industry to take actions to reduce their costs. This has been one of governments aims. However, the increased emphasis on price competition has also prompted industry to pursue short cuts in production and reductions in investments for new equipment modernization.

The willingness of industry to aggressively pursue innovative R&D for defense purposes is related to the real or imagined profit potential. Through second sourcing, we have reduced industry profit from the Navy. [Ref. 29:p 10]

J. INDUSTRY AND THE MARKET PLACE

The defense industry today is concerned with four key business areas that are vital to their survival:

1. Program and process stability;
2. protection of investment and competitive edge;
3. reduction of overhead;
4. long term direction for planning.

Each of these areas has a direct influence on a successful business operation, specifically for long term stable profits. [Ref. 29:p 2]

In basic business financial terms, industry's goal in the market place is to gain market share and make a profit. When competitive forces govern the environment industry lowers its prices compared to its competition to ensure that its products are bought. This action however also lowers the profit gained from its products sales. One way industry counters this is to reduce its overhead and production costs to compensate for the lower sale price. This in turn again raises the profit margin without raising the price of the product. A more prevalent method utilized very effectively by the Japanese auto industry, is through capture of the dominant market share. Through research and investment industry produces higher quality products and sells them at prices that their competitors can not match. The result is also a very low profit return on each unit sold. However, through the capture of the market share, more products are produced and sold again raising the overall total profit margin. This is the basic profit principle behind the forces of mass production and market share. The current DoD acquisition policies provide for no such flexibility or incentives for industry. Acquisition policies, such as dual sourcing, force industry to lower its costs and unit prices to compete without providing an incentive to replace their lost profit through increased market share.

A study conducted by Mr. James Blackwell, a defense expert in the makeup of the defense industrial base, indicated that of the 118,489 defense contractors existing in 1982, 60% (approximately 80,482) had departed from the defense industrial base by 1987. Mr. Blackwell stated "There is a very real danger that corporate America is going to walk away from defense". [Ref. 30:p D11]

Mr. Atwood, the Deputy Secretary of Defense has stated:

We must not destroy the defense industrial base or the defense technological base. If we end up spreading our procurement so thin that people without the technological capability are surviving we will tend to lose the kind of companies we want to keep. [Ref. 30:p D11]

Economist Frederick Scherer stated, "that too much competition can discourage rather than stimulate vigorous effort." [Ref. 31:p 289] Competition may become a destabilizing factor; but improperly implemented competition efforts will and have produced counter-productive results. Currently cost is the driving factor in the source selection criteria. In this environment, defense contractors, in order to win and then profit from competitive Government contract awards, will be motivated to pursue less risky, technical and innovative methods in an attempt to maximize their profit potential and to control costs. This Deming would state is a suboptimized system driven by short term objectives and fear.

In the current competition arena it really doesn't "pay" a supplier to do a good job and provide high quality goods or services since the procurement process basically starts over with each new bid; prior performance does not matter at all and there is a built-in incentive to cut corners. As a result, the Government is often ending up with marginal goods and in many cases inferior goods, compared to what could have been procured economically had the system been optimized and not force fed. What is most frustrating of all is that the same suppliers on the next invitation for bids will be treated just as though they had done exemplarily work on previous contracts. The invisible hand is not at work here as it is in the commercial world, where good

performance is rewarded and poor performers are not solicited to provide bids for upcoming work.

K. THE GROWTH OF MICROMANAGEMENT

In a 1986 survey conducted by the Packard Commission, 58% of the individuals polled believed that half of the defense budget was wasted because of fraud and abuse. [Ref. 32:p 23] Today this opinion still flourishes within Congress. Congress has reacted strongly to its and the public's perceived lack of confidence in DoD and industry by passing continuing legislation that provides for rigid rules under which the DAS must operate. The intent of Congress appears to have been to control the behavior of industry and the operation of DoD by the numbers to prevent any potential industrial profiteering. To document compliance of the constraints and procedures as well as stimulate competition, the Government has hired approximately 6,000 additional employees. [Ref. 33:p 69] The defense industry in turn has also hired thousands of new people to produce the reports and answer all the questions that these 6,000 new Government employees generated in the name of competition.

It appears that over the last ten years, Congress has promoted a "trend to criminalize all aspects of the DAS, from the prebid stage through completion of the contract." [Ref. 32:p 23] This attitude has fostered an increasingly adversarial relationship between Government and the defense industry. Industry has invested considerable effort satisfying government's paperwork requirements as well as questions about its manufacturing practices. This surely has cost the Government and the defense industry an additional couple hundred million dollars a year. According to John O'Brien, President and chairman of the Board of Grumman Corp., the cost of all defense procurement reforms of recent years, including the drive for more competition, comes to "about eight and a half billion dollars, which is equivalent to 50% of the total equity of the major companies in our (defense) industry." [Ref. 34:p

69] It is no wonder that many companies have stated that the expense and procedures required to compete and operate in the DAS have had an increasingly negative impact on their financial conditions as a whole. [Ref. 32:p 23]

Government studies on the laws and regulations that have evolved over the past decade have revealed that a majority of them have been put in place in response to a specific occurrences of perceived poor management by DoD or wrong doing by industry. These rules were intended to ensure that these occurrences would never happen again. However, these studies have also revealed that these same rules and regulations have fostered an adversarial relationship between Government and industry to the point that they are counter-productive. Thomas Pawnell of Martin Marietta Corporation, has stated that the current atmosphere is "over-regulated and over-legislated" to the extent of "stultifying and inhibiting innovation to the point where it fosters an overly cautious approach to management (fear)." [Ref. 34:p 221]

In contemplating these issues, their costs, and Congressional resolution to slash the defense budget as a "Peace Dividend" fallout, it is not hard to understand why defense contractors such as Eaton, Bendix, Gould, IC Industries, and many others are shifting their investments away from defense and into the more lucrative and stable civilian sector. [Ref 34:p 69]

A 1988 Air Force Institute of Technology study revealed that the current reluctance of the defense industry to modernize its manufacturing capabilities has been primarily caused by a perceived lack of consistent procurement activities and incentives by the Government that would sufficiently motivate and make it economical for the defense industry to be willing to modernize its production capacities. As a result, this has caused a serious degradation of the defense industrial base. [Ref. 36]

The Competition Advocate for United Technologies Corp., Mr. Joel Marsh called competition:

A key ingredient of our free enterprise/market orientated economy... give competition a chance, let it work in the marketplace. Don't load it down with onerous requirements and additional remedies,... it works best when not encumbered by too many rules and when it allows for risk and innovation. [Ref. 3 4:p 69]

L. CONGRESS

1. Political Interests

Congress has been the source of many speeches in favor of greater competition and use of commercial products. It however, has also been the source of the laws that require the DoD to do its procurement practices in the current manner. As Representative James Courtner has stated:

Congress is not the answer to waste. Congress is the problem. They mean well, but reformers are too often a cause of what is wrong with the military. [Ref. 36:p 22]

A large share of the procurement legislation that is passed by Congress is not intended to improve the defense competitive procurement process but to achieve some political or social objective. Congress' intent of CICA can best be described as "focusing on the procedures in awarding contracts rather than on the results of the procedures." [Ref. 37:p 25] A good example of this is the construction field within the states of Alaska and Hawaii. While Congress stresses its mandate for more competition in DoD commercial construction projects, senators from these two states have enacted laws which require that all labor being utilized on construction projects for these two states must come from within these two states. Individuals from the other 48 states are not allowed to be utilized because they are not residents of these two respective states. As a result of these laws a potentially higher quality construction force is eliminated. A further result is that the wage scale being paid to these "resident laborers" is significantly higher than if "outside" sources were allowed to compete. [Ref. 38]

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A problem that does not appear to have been fully addressed, is what effect the massive downsizing of the defense budget will have on the economy. It is easy for a Congressman to vote for deficit reduction spending policy. However, when the decision to cast his/her vote comes, each congressman is going to have to consider and decide where these dollars are going to come from. No Congressman is willingly going to allow these dollars to be taken from his constituents districts.

M. ON THE HORIZON

Table 2, reflects the sales and revenue dependence of the top 25 contractors who are currently conducting business with the DoD. The data contained in Table 2, is for 1989, the latest year available. The total dollar figure for contracts awarded in that year amounted to \$129 billion. [Ref. 42:p 68]

In response to the dwindling defense budget, contractors are trimming their costs by laying off thousands of employees. These job losses at the prime contractor level will be invariably accompanied by job losses at the sub-contractor level. The prime contractors, as a result of the new economic realities and their belt tightening process, will try to invariably survive by seeking smaller programs, as well as taking on larger roles as sub-contractors on the few large DoD programs available. These types of actions by the large corporations will make it even more difficult for the sub-contractor (second tier) to compete and survive. Another repercussion has been industry's decision to dramatically cut back its level of spending on research and on new plants and equipment." [Ref. 43:p D1] GD, during the next four years, plans to spend less than half of what it spent on research and capital investment during the prior four years. [Ref. 43:p D5]

Top 25 DoD Contractors

Table 2

Rank	Company	Pentagon Contracts \$ millions	Major Weapons Systems	% Sales Revenues Defense	Comments
1	McDonald Douglas	\$8,617.2	F/A-18 Hornet, F-15 Eagle, AV-8B Harrier Jumpjet, Tomahawk missiles, AH-64 Apache	60	No. 1 contractor since 1987. Cancellation of \$57 billion A-12 program was a big blow. Another write-off looms if cost overruns on C-17 transport aren't contained. Hoping new MD-90 and MD-11 commercial jets will offset these losses.
2	General Dynamics	\$6,699.2	F-16 Falcon, Trident Submarine, M-1 tank, Tomahawk, Sparrow, and Stinger Missiles	87	Among top 3 for last 8 years. Also hurt by A-12 program cancellation. No plans for diversification. Recently Navy Seawolf Submarine contract.
3	General Electric	\$5,771.0	Agilex radar, Trident guidance systems, F404 and F110 aircraft engines	16	Commercial sector sales amount to \$55 billion, with smaller defense budget plans to make significant cuts in defense related work by 1992.
4	Raytheon	\$3,691.5	Patriot, Hawk, Amraam, and Phoenix missiles, Agilex radar	55	Patriot missile accounts for 16% of revenues.
5	General Motors	\$3,691.5	Amraam, Maverick, Tow, and Phoenix missiles, components for M-1 tank and Mk-48 torpedo	4	World leader in defense electronic sales.
6	Lockheed	\$3,651.5	Trident II missile, F-117 Stealth Fighter, C-130 transport, electronic warfare systems	91	Plans to reduce dependence to 67% by mid 1990's due to termination of P-7 antishubmarine program. Recently awarded contract share of ATF program.
7	United Technologies	\$3,556.3	F100 and J52 Aircraft engines, Blackhawk, Seahawk, and Super Stallion Helicopters	N/A	Leading supplier to Boeing. Recently forged alliance with Germany's Daimler-Benz to produce new generation of jet engines.
8	Martin Marietta	\$3,336.6	Lantrin night vision system, Patriot, Hellfire, and Vopperhead missiles	75	Primary business focus is on aerospace component technology.
9	Boeing	\$2,868.4	E-3A WACS, CH-47 Helicopter, Replacement wings for A-6 aircraft	20	Defense accounts for 20% of sales, but not profit. With share of contract award for ATF this trend should change. Commercial sector business strongest ever with backlog of 1,850 commercial jets on order.
10	Grumman	\$2,373.1	F-14 Tomcat, E-2C Hawkeye, EA-6B Prowler, and A-6 Intruder	70	Main products F-14, and A-6 are slated to end production in 1992. Company has no follow on business scheduled. Attempts at diversification have been disastrous.
11	GTE	\$2,341.5	Mobile battlefield communications systems	10	Main defense business focuses on communications and intelligence equipment.
12	Rockwell	\$2,132.8	Navstar Global Positioning system, ICBM guidance systems, Hellfire missile	25	Company has aggressively decreased its dependence on defense related sales from 50% in 1985 to 25% in 1989.
13	Westinghouse Electric	\$1,646.6	Radar for R-16s and AWACS, electronic jammers, Trident missile launchers	25	Veteran of defense business for 70 years.
14	Honeywell	\$1,555.4	Flight controls, displays and navigation systems for F-16 and F-15 aircraft	13	In anticipation of decreased defense budgets, spun-off one of its military sales divisions in 1990. Reduced its defense dependence from 25% to 13%.
15	Liton Industries	\$1,436.6	Destroyers, Cruisers, and Amphibious assault ships, navigation systems	50%	Its Ingalls shipbuilding division is well run and profitable. Boosted earnings per share since 1987 by buying back 25% of its stock.
16	IBM	\$1,306.7	Antisubmarine systems and related software	1	Total Government sales account for less than 5% of company revenues. Main Government customers are FAA and NASA.
17	TRW	\$1,293.6	Satellite communications battlefield information systems	40	Global leaders in space age communications.
18	Unisys	\$1,244.6	Shipboard and ground-based computer systems	20	Primary defense customer is the Navy.
19	ITT	\$1,163.3	Army combat radios, generation III night vision goggles	8	
20	Texas Instruments	\$946.3	HARM missile, Advanced anti-tank weapon	33	Expects to decrease business with DoD due to shrinking defense budget. Recently laid off 540 defense workers.
21	Tenneco	\$915.9	Los Angeles-class nuclear attack subs, Nimitz class nuclear aircraft carriers	15	Recently lost contract to build new generation Seawolf attack submarine to Electric Boat, a sub-division of General Dynamics. Tenneco has protested contract award. Tenneco's Newport News shipyard has an \$8 billion backlog for ship construction that will ensure a stable income for the next four years.
22	Textron	\$906.5	AH-1W and OH-58D helicopters, engines and controls for M-1 tank	25	Company is depending on V-22 Osprey helicopter program to lift profits.
23	Allied Signal	\$905.6	Engines for helicopters, Air power units for B-2 bomber	20	Commercial sector business has suffered due to budget cutting by Detroit auto makers.
24	Avondale Industries	\$879.0	Coastal minehunters and LACAC amphibious craft	70	Plans to dramatically reduce its dependence on defense sales by mid 1990's.
25	AMC	\$795.8	Bradley Fighting Vehicle	25	Anticipates defense revenues to decrease as defense budget decreases.

Secretary of Defense Cheney eluded to this researcher that the DoD does not have enough business or dollars to keep all of the ship building industry in business [Ref. 39] As a result, it appears that some companies are going to have to go. For evaluation purposes consider the following. One shipyard must go, either Bath Ironworks in Maine, or Litton/Ingalls in Mississippi. DoD must compare and evaluate the two shipyards to see which best meet its needs strategically and economically. Based on pure common sense the choice would be Litton/Ingalls for the following reasons: It is a newer and more versatile facility, that can build more vessels of varying sizes. It also provide the best possibilities for future expansion and flexibility in long-term planning. Bath Ironworks is an older and less economically efficient facility and can only build combatant vessels of limited size. However, in the real world, political interests also enter the decision making process to cloud the picture. The President of the Senate is from the state of Maine. He would have a considerable interest, influence and opinion regarding the loss of jobs and prosperity for his constituents.

The Litton and Bath Ironworks example is currently only a hypothetical situation. For the submarine building industry however, it is a reality. There currently are only two shipyards which can build submarines for the United States Navy in operation in America today. GD/Electric Boat of Connecticut, and Tenneco, in Newport News, Virginia. These two facilities have been embroiled in an economic and political dual between New England and Virginia to build the Navy's next generation 2 billion dollar Seawolf attack submarine. Congress and DoD have downsized the total quantity of Seawolf class submarines to be built to approximately 8 [Ref. 44 p 11]. Only one will be authorized and funded each fiscal year to be built. A program with a production cost this high and a production quantity this low is very uneconomical to dual source. A comparative analysis of each companies future potential use to the DoD, reveals from a

versatile facility that can build all types of vessels from submarines to aircraft carriers. It also has a proven track record of producing quality workmanship. Electric Boat has only the capacity to build submarines. After the Seawolf program is concluded it would have no business and could not, in the interim, compete to build other vessel type while awaiting the development of a new submarine class. Tenneco could. To maintain a flexible and firm production base for future long-term military planning requirements, Tenneco it appears, should be the obvious choice. However, on May 3, 1991, Electric Boat was awarded the Seawolf contract. The stated bottom line justification was that the "key determinant was price" and the "program went to the lowest bidder." [Ref 45: 33] The unstated political justification appears to be that GD/Electric Boat "would close its Electric Boat facility and eliminate 22,000 jobs" if it did not receive the Seawolf contract. [Ref. 45:p 33]

The high stakes battle for the second Seawolf class submarine - Electric Boat is building the first - was cast as a region's economic survival against maintaining diversity in the nation's military industry. [Ref. 45:p 33]

Tenneco is currently building the last of the nuclear aircraft carriers, and has enough DoD business to keep it going until mid 1995. As a result, it was viewed as less vulnerable by Government industry analysts of the only two submarine shipyards in America. It should be noted, that in accordance with CICA, Tenneco immediately filed a protest suit on the award of the Seawolf contract to Electric Boat. The above issue is only a fraction of what Government will be facing economically and politically as the defense industry fights to survive in the current austere budgetary climate.

N. SUMMARY

In 1984, Congress passed the CICA, and followed this with a number of amendments to defense bills which put increasing pressure on the DoD to devote more attention and more resources to competition in all future procurements. CICA incorporated "full and

open" competition as the standard for awarding contracts. It also stipulated that all responsible sources would be permitted to compete for Government contracts. The Government would in-turn receive its materials and services at fair and reasonable prices. CICA further stipulated and strengthened the justification, approval, and notice requirements to safeguard against unnecessary sole source contracts, established competition advocates to enhance accountability, and strengthened the bid protest method, as a means of enforcing the competitive process.

Contracting with DoD is conducted in a markedly different environment from other commercial contracting activities. Defense contractors must observe various rigid, unique, and complex contract procurement rules, regulations, and statutory requirements in order to participate and compete for Government contracts. A distinct and costly body of contract principles has evolved in the defense contracting field that does not have an equivalent counterpart in the commercial arena.

The American defense industry operates in a unique market environment. Unlike a monopoly where there is only one supplier for a multitude of buyers, the defense industry is faced with only one buyer for its multitude of suppliers. This is referred to as "monopsony" buying power. Webster's American dictionary defines a monopsony as: "a situation in which one buyer seeks the products or services of several sellers."

[Ref. 46:p 766]

This chapter discussed key features of the United States defense Industrial base as well as some of the problems that have grown out of this structure. In November of 1980, several important defense acquisition reports were issued, they emphasized the growing problems at all levels of the defense industrial base. "At the prime contractor level, the reports noted unhealthy financial conditions, aging plants and equipment, excess capacity, and the high cost of weapons systems. At the lower tiers, they noted a diminishing number of U.S. sources, and growing dependency on foreign sources".

[Ref. 15:p 242] From the newly issued reports in 1989-1990, on Bolstering Defense Industrial Competitiveness, it seems that these issues were not fully addressed during the extensive growth in DoD procurements during the decade of the 80's.

IV. ANALYSIS

Chapter IV, will present data on the different studies conducted on the shrinking Defense Industrial Base (DIB). The chapter will begin by reviewing the Defense Systems Management College (DSMC) study, dated 5 December 1990, on "Why Firms are Leaving the Defense Market". Next, the findings of the DSMC study will be compared to the results of a study on the "Barriers to Implementing Total Quality Management Principles in the DoD Acquisition Process" (Appendix A). The purpose of this comparison will be to determine if the forces motivating industry to leave or decrease its willingness to conduct business with DoD are the same forces or barriers, that would inhibit the successful implementation of the Deming Management Philosophy within the DoD.

A. DSMC STUDY

1. Introduction

In the Fall of 1990, the Defense Systems Management College (DSMC), concluded a study on "Why firms are leaving the defense market". The purpose of this study was to determine why firms were actually leaving or considering leaving. The study attempted to cover the following specific objectives: [Ref. 47:p i]

1. Determine whether or not there is an unacceptable exodus of firms from the defense sector or a marked reluctance on the part of new corporations to enter the defense market;
2. determine if one of the reasons to the above question is a result of the increased administrative burdens imposed by the DoD;
3. identify which burdens firms find as onerous;
4. recommend specific actions that should be taken to address those concerns.
[Ref. 47:p 12]

2. METHODOLOGY

DSMC sent out 831 survey questionnaires by mail to a cross-section of industries and their sub-tiers of the Defense Industrial Base (DIB). [Ref. 47:p i] The DIB population was defined to include the following:

1. Shipbuilding: new building yards and ship repair facilities;
2. Aerospace: aircraft and missile manufacturers and supplies;
3. Electronic: communications and electronics manufacturers and supplies;
4. Engineering services/software: professional services and software related companies;
5. Industrial fasteners: companies engaged in supply or manufacture of screws, bolts, nuts, etc. and;
6. Manufacturing: all manufacturing firms not listed in categories 1-5 above.

The sample population was identified to include firms that had a high level of knowledge concerning the process and procedures on conducting business with the DoD. Table 3, indicates the total percentage distribution of responses from each population area. [Ref. 47:p 12]

Survey Response Results

Table 3

Industry	Responded	% of Total Survey Responses
Shipbuilding	17	7
Aerospace	27	11
Electronic	50	20
Engineering/Software	31	13
Industrial Fasteners	21	9
Manufacturing	67	27
Other	31	13
Total Response Rate	244	29.4

In addition to the survey questionnaire mailed, 50 interviews were conducted with company executives who were identified as having a strong interest in improving the acquisition process. [Ref. 47:p i]

3. Survey Instrument

The questionnaire utilized by DSMC (Appendix B), was designed to:

1. Reach a large number of potential respondents;
2. present the same questionnaire in the same format to all possible respondents;
3. provide anonymity to those who desired it in their candid responses. [Ref. 47:p 9]

The variety of questions utilized by the survey, were designed to cover the following areas: demographic or company descriptive, forced response, multiple responses, and open ended. The aim of this style of questionnaire was to:

1. Determine company demographics (size, type of firm);
2. explore reasons for private firms to leave the defense sector, diminish the amount of work done, or refuse to enter in the first place;
3. be objective but designed with several open ended questions that will encourage candor and creativity on the part of the respondents; and
4. be short, manageable, and fully utilizable. [Ref. 47:p 9]

4. Contrast of Survey Results

The approach and structure of this survey took into consideration several similar studies concerning the same general area. They included (1) "An analysis of Reasons Companies Refuse to Participate in Defense Business", by Professor David Lamm of the Naval Postgraduate School, and (2) "An Analysis of the Reasons Why Nonferrous Foundry Subcontractors Refuse to Participate in DoD Business", by Jon Schaubert. While both Lamm's and Schaubert's studies dealt with firms leaving the defense sector, Lamm's study dealt primarily with the small business community, while Schaubert's study dealt primarily with subcontractors.[Ref.47:p 4] Professor Lamm's 1987 study, polled 1,317 defense related industrial firms and asked them if they were going to continue to do business with the DoD and if not, why.

From the responses received, the major reasons that some of these companies were going to refuse to do or conduct business with the DoD were:

1. The burdensome paperwork ** (70%)
2. Government bidding methods (57%)
3. Inflexible procurement policies ** (38%)
4. More attractive commercial ventures. **
5. Low profitability ** (32%)
6. Government attitude (32%) [Ref. 48:p 54]

The 1988 Schaubert study, surveyed 48 foundry subcontractors indicating their desire to leave the defense sector. He identified from their responses, the following reasons for their refusal to conduct business in the defense sector:

1. Inflexible Government procurement methods/policies. **
2. Burdensome paperwork requirements. **
3. More attractive commercial sales. **
4. Over restrictive quality standards
5. Inconsistent quality requirements.
6. Low profitability/lost money on Government related subcontracts **
[Ref. 47:p 5]

Note: The double asterisk indicates the causes/reasons which were identified in the top six of both the Lamm and Schaubert studies.

Table 4, shows the results of the 1990 DSMC study. [Ref. 47:p 20] The respondents of this study identified what causes they perceived were motivating firms to leave the defense sector. The respondents also indicated what causes if changed or eliminated, would encourage them to remain in the defense sector.

1990 DSMC Study Results

Table 4

CAUSE	ADMINISTRATIVE INCENTIVE	BURDEN TO STAY
Procurement policy**	57%	54%
Audit procedures	46%	0%
Bidding methods**	38%	16%
Late payment	34%	12%
Government attitude**	33%	29%
DoD specifications*	30%	11%
Profitability**	0	11%

Note: The double asterisk indicates those causes which were also identified on the Lamm and Schaubert studies. The single asterisk indicates that that cause was only identified on one of the studies

It appears from the results of the 1990 DSMC study, that in one form or another it identified the same major reasons firms are leaving or refusing to conduct business with the DoD that the Lamm and Schaubert studies indicated in 1987, and 1988.

B. TQM SURVEY FINDINGS

Appendix A, contains the results of the research study "Barriers to Implementing Total Quality Management Principles in the DoD Acquisition Process". This study was designed to gather data from both the defense industry and Government managers on what they perceived as existing barriers impeding implementation of the Deming Management Philosophy within the DoD.

The results of the 1990 TQM study, identified the following six areas as the obstacles constricting the successful implementation of Deming's Management Philosophy within the DoD.

1. Management Willingness to Change
2. Congressional Oversight
3. Competition in Contracting Act of 1984

4. Government Measurement Practices

5. Training

6. Single Year Budgeting

C. SURVEY COMPARISONS

The remaining portion of this chapter will analyze the apparent similarities of the forces motivating the defense sector to leave the defense industrial base, and the barriers precluding the possible implementation of Deming's Management Philosophy.

The Deming Management Philosophy stresses that the most important losses to a system are "unknowable" and "unmeasurable." However, the question then arises, how do you manage something that is not measurable? How do you measure in dollars, customer or worker satisfaction? Deming states "It is nonsense to say that if you can't measure it, you can't manage it". [Ref. 6] He contends that when management understands his management principles, they will realize that these "unknowable" and "unmeasurable" losses are the very ones that must be managed, in order to promote constructive change to any system.

Upon first glance, it appears that the finding of the TQM and DSMC studies seem to overlap. This however, is not entirely accurate. The DSMC study appears to have concentrated its efforts on identifying what the administrative burdens are motivating industry to depart the defense sector. The TQM study, while identifying administrative burdens through various barriers did not isolate itself to such a narrow approach. As a result, the findings of the DSMC and TQM studies cannot be compared on a one to one scale. For example, in the DSMC study, identified as the category procurement policies does not directly correspond to the TQM barrier, Government measurement practices. Actually, procurement policies overlap three TQM barriers, Congressional oversight, CICA, and Measurement practices. The following analysis will attempt to identify the relevant DSMC findings and correlate them to the appropriate TQM barrier(s).

1. Procurement Policies

From the DSMC study overview, it appears that the term procurement policies was defined to encompass all procurement policies, paperwork, and regulations pertaining to Government. [Ref. 47:p 30] The TQM survey on the other hand, attempted to separate these areas into three relatively distinct barriers (Congressional oversight, CICA, and Government measurement practices).

In replying to the DSMC survey, 54% of the respondents indicated that changes in this area would induce firms to remain in the defense sector. [Ref. 47:p 35] DSMC respondents commented several times on how difficult it was to obtain consistent answers to questions on policy and regulations from Government personnel. They described the existing laws as being "too cumbersome," and stated that it appeared they were being implemented without a thorough evaluation of their ultimate impact on the Defense Acquisition System (DAS). [Ref. 47:p 31]

John Welch Jr., Assistant Secretary of the Air Force for Acquisition, after testifying before Congress on how indiscriminate spending, program cost overruns, and \$600 toilet seat scandals have left the Pentagon procurement system in disarray, stated:

I think we're almost devoid of trust in the system....I've testified 100 times on the Hill in three years. It's not so nifty to sit there and be called incompetent or a crook or several other things. [Ref. 49:p 36]

The TQM respondents regarding this area seemed to be of the opinion, that the detailed and numerous procurement statutes imposed by Congress, was its method of stating its lack of confidence and mistrust of the DoD acquisition officials. It appears that the DoD in an apparent attempt to reverse this perception, has expanded its own self-governance policies, included in the DoD supplement to the Federal Acquisition Regulation (DFAR), to the point where it is larger than the Federal Acquisition Regulation (FAR) itself.

The concern raised here by respondents of both studies, appears to be that this significant increase in statutes has extensively complicated and slowed the acquisition process from draft Request for Proposals (RFP), to ultimate contract award. The problems identified by the respondents seem to stem from a perceived lack of trust by Congress in the DoD Acquisition Officials. As a result, the respondents seem to be of the opinion that the courses of action taken by both Congress and DoD have been very reactive in nature and short sighted in thinking. Inspections and over-regulation are the result. This, Deming would identify as the Deadly Disease of MB0, short term thinking based on a go, no go basis. Deming also refers to this behavior as Management by Fear

2. Government Attitude

It appears that to the respondents of the DSMC study, "Government attitude" correlated to the attitude of the Government auditors. This attitude reflected the thought that: "the contractor is a criminal, it is my job to find fraud". [Ref. 47: p 18]

A DSMC respondent stated

The system seems to presume criminal conduct is rampant in industry and that government's role is to police and aggressively prosecute any allegation. DCAA auditors who are relatively inexperienced, are encouraged to prematurely report suspected "indicators" in a covert and unregulated manner to Government investigative agencies. [Ref. 47: p 18]

The DSMC respondent also identified the published Inspector General Handbooks which DCAA auditors are guided by: "Indicators of Fraud in DoD Procurement, Handbook on Scenarios of Potential Fraud", and "Handbook on Labor Fraud Indicators". The following examples were identified from these books. [Ref. 47: p 18]

... the purpose of this handbook is to stimulate the contract auditor's imagination regarding detection of labor fraud indicators.

... the auditor should "think fraud" when making a review. This awareness factor cannot be overemphasized

The TQM barriers that seem to apply here are Congressional oversight, CICA, and Measurement practices. It appears that while Procurement policies seem to have fostered an adversarial relationship between Congress and DoD, Government attitude seems to have fostered an adversarial relationship between DoD and industry. The reason that the above three barriers were identified as being relevant, is due to the fact they are all interrelated. It appears that the same Deadly Diseases that are driving the impediment Procurement policies are also driving the impediment Government attitude with regard to audits. The emphasis appears to be on the short term, with a reward system within DoD that provides incentives and rewards (promotions) auditors for finding fault with industry.

A TQM respondent commented:

It seems that DCAA spends more time going after industry after the contract has been awarded (2 years), rather than trying to work up front to prevent a problem from occurring.

29% of the DSMC respondents, indicated that a change in Government's attitude towards industry would incentivize them to remain within the defense sector. Industry appears to be looking for "fear" be driven out of doing business with DoD. They want a climate of trust be rekindled. Deming indicates that in order for his management philosophy to be effective, the element of fear must be removed and an atmosphere of trust must be established. [Ref. 6]

3. Bidding Methods, Profitability, and DoD Specifications

These three areas were ranked in the DSMC study as the third, fourth, and fifth overall problems (respectively), that if changed would incentivize firms to remain in the defense sector. These areas were not covered in great detail in the DSMC report, and therefore could not be directly correlated to the TQM study barriers. However, based on respondent comments it was implied that specifications and profits appeared to be measuring tools by which auditors and inspectors could determine industry's

performance. With regard to profitability, the respondent's comments seemed to migrate back into a discussion of Government attitude. Respondents stated that according to DoD, "profit is a dirty word". [Ref. 47:p 22]

For GD, sticking with defense has not been very profitable. In the first three quarters of 1990, GD lost \$48 million on sales to the DoD. In their best years of DoD sales, their pretax profit has been approximately 6%. One GD official commented, "There is better money to be made in the manufacture of cream cheese." [Ref. 49:p 40]

Many respondents were of the opinion that few Government officials understood, that in order for a firm to operate and grow, it must make a profit. The perception appeared to be that in today's competitive environment the driving factor is cost, with little allowance for profit. The DSMC study noted that, "respondent after respondent complained of the attitude within Government that all contractors were criminals, as proven by their desire to make a profit." [Ref. 47:p 22]

D. OBSERVATIONS

It appears from the DSMC survey comments, that there is one primary underlying perception for industry's exodus from the defense sector: Government's attitude. All of the other reasons or excuses identified by the study appear to stem from this root cause.

The DSMC study seems to have identified the force driving the administrative burdens motivating industry to leave the defense sector. However, this study was only directed towards administrative burdens and attitude. The TQM barrier study approached the same general subject, but with a broader objective. In the TQM study, "Management Willingness to Change," was perceived as the greatest barrier precluding the successful implementation of the Deming Management Philosophy within DoD. From Tables 7, 8, and 9, it can be seen how this barrier overwhelms all other barriers.

In comparison with the comments of the DSMC respondents, Government's attitude appears to be the driving force behind all of the identified forces motivating industry to leave or decrease its willingness to conduct business with DoD.

The perception by the respondents of the TQM and DSMC studies, appears to indicate that management's unwillingness to change (its attitude), is by far the most pressing issue that needs to be addressed and improved. It appears that without this change, Deming's Management Philosophy cannot be successfully implemented within the DoD, and industry in turn will not be incentivized to remain within the defense sector.

E. MANAGEMENT'S WILLINGNESS TO CHANGE

Deming's Management Philosophy stresses that a majority of the problems of any system can only be corrected by management. The results of Table 10 support this principle. It displays how other barriers are influenced (driven) by Government law or regulation (GLR), or internal policy (IP). While the barrier "Management's Willingness to Change" is influenced (driven) by neither GLR or IP, it is perceived to be guided by management's attitude.

The perceptions of the respondents from both studies indicate that "Management's Willingness to Change," and attitude are the most significant obstacles that must be overcome by management, if change is to occur. The chairman and CEO of a large aerospace firm stated in the DSMC survey that

By far the paramount problem is what I might refer to as the "business environment" - - the presumption that all those who conduct business with the Department of Defense are fundamentally dishonest...This I believe is what deters young people today from joining the defense industry and what drives out individuals and firms who are currently in the defense industry [Ref. 47: p 52]

Deming's philosophy implies that management is a function of leadership. In its role as a leader, it is management's responsibility to establish the business

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Deming's philosophy implies that management is a function of leadership. In its role as a leader, it is management's responsibility to establish the business

The respondents recommended that management receive continuous education and training. Proponents for change, target key influential personnel. If education and training does not influence a willingness to change, then where possible the individuals may have to be removed from his or her position of authority.

b. Environment

Respondents expressed the following opinions regarding their perception of the environment created by management:

1. Management is unwilling to give up any control.
2. Top management believes it is inherently superior, "I know what is best".
3. Management perceives it will lose control of its "rice bowl".
4. Employees do not see top management living out TQM. The result is employees see TQM as just another buzz word that will eventually go away.
5. Management is not removing the "fear".

The respondents recommended that management constantly demonstrate their commitment to the TQM process. Incentives and rewards must be designed to support the Deming Management Principles.

Management drives the environment. It establishes the tone under which the organization must operate. If management endorses a change and establishes a consistent behavior and leadership (constancy of purpose) in doing so, then other associated barriers will fall due to the natural forces of change.

F. CHANGE

Based on the study comparisons and the apparent frequency and frustration attributed to it by the survey respondents, it appears that "Management's Willingness to Change" is the most important barrier that must be overcome. Just as Government attitude was repeatedly singled out in the DSMC study, the attitude of management must be supportive of change before any change can take place.

Harold Brown, President Jimmy Carter's Secretary of Defense, in support of this observation has commented on how this will be one of the toughest leadership challenges of the 1990's:

You have to realize that there are several hundred thousand people whose livelihood depends on keeping the system the way it is. You need a few good people...with authority to change the system. [Ref. 49:p 36]

The Deming Management Philosophy stresses that before transformation can occur within a system, top management must first adopt and apply the principles of TQM. The analysis of the respondent's comments and rankings of the two studies indicates, that the obstacles "Management's Willingness to Change" and Government attitude are linked. Management's unwillingness to change its attitude was perceived to imply that cultural and political boundaries must be overcome before any change will occur.

The adoption of the Deming Management Philosophy by top management was perceived to be the key requirement that would lead to natural change and transformation of the DoD Defense Acquisition System over time. This fundamental shift must occur before the other obstacles in either of the two studies can be overcome

Only top management can establish the constancy of purpose necessary to know and then to meet the customers' needs and expectations. Only they can make policy, establish the set of core values, or set long-term course for the corporation. Many companies do have policy statements that reflect top management's vision. But it is easy for the folks on the top floor to get religion. Talk is cheap. Top management might be able to set the course, but may never realize that it is also responsible to provide a road map so that the rest of the organization may follow. [Ref. 51:p 11]

The numerous observations and recommendations of the survey respondents reflect some of the key principles of Deming's Management philosophy that are required to bring about change. They include:

1. Learn the new philosophy, top management and everybody.
2. Institute training.
3. Teach and institute leadership.
4. Drive out fear. Create trust. Create a climate for innovation.
5. Create and publish to all employees a statement of the aims and purposes of the organization. Management must demonstrate constantly their commitment to this statement.
6. Take action to accomplish the transformation.

Deadly Diseases to be avoided and overcome:

1. Lack of constancy of purpose in planning.
2. Emphasis on short-term thinking and planning. This promotes fear and instability and inhibits constancy of purpose.

When management understands, accepts, and acknowledges that change is required, it may be possible that management's unwillingness to change its attitude will be overcome. However, it appears based on history, that a change of this magnitude will take a long time. Perhaps as much as ten years, before the full benefits of adopting TQM may be realized.

G. CHAPTER SUMMARY

This chapter addressed the problems identified by the DSMC study and compared them with the barriers identified by the TQM study in appendix A. The two studies identified Government's attitude and "Management's Willingness to Change," as the key obstacles respectively.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. Management's unwillingness to change its attitude is the most significant obstacle that must be overcome to induce industry to return or stay within the defense sector.

Many obstacles were identified under the guise of administrative burdens that must be overcome to provide incentive for industry to return and remain within the defense sector. The number one obstacle mentioned, both directly and indirectly, more than any other, was management's unwillingness to change its attitude. This barrier is the driving force behind all of the other obstacles identified. If any corrective action is to be taken, this barrier will have to be overcome.

2. Implementation of Deming's Management Philosophy within the Government could possibly help keep industry in the defense sector.

If Deming's Management Philosophy is adopted and implemented to promote continuous improvement of the system, management's unwillingness to change its attitude will, in most cases, increase. The natural forces of change will stimulate management's assimilation of Deming's system of Profound Knowledge.

3. Congress was identified as the top management who has the capability and power to influence and initiate changes within the Government.

Congress is responsible for providing the direction and environment in which the Government must operate. Congress must adopt and endorse change through Deming's Management Philosophy. Only then will a fundamental shift in attitude occur throughout the lower levels of management and in all employees over time.

4. The political environment in which the Congress operates is the most significant barrier impeding the assimilation and implementation of Deming's Management Philosophy.

The political environment that members of Congress operate in fosters a very competitive atmosphere for political power and survival. e.g., constituent votes determine if a politician stays in office. Short term objectives to promote constituent interests are counter productive to the adoption of the Deming Management Philosophy. Overcoming this obstacle will be the most challenging for the proponents of change within Government. It involves a fundamental shift in the way in which Congress conducts its business.

B. RECOMMENDATION

1. Top management (Congress) within Government must exercise its leadership responsibilities and adopt Deming's 14 Points of Transformation.

Adoption of the Deming Management Philosophy will prove fruitless unless top management demonstrates leadership and commitment to the process. The phase, leadership by example, is very appropriate for the successful implementation of Deming's Management Philosophy. The required change in attitude will take time, and top management's commitment to bring about change must not falter. It must be continuously supportive of the process over the years that it will take for positive change and results to occur.

2. Proponents of Deming's Management Philosophy, should continuously target and educate top management to encourage and foster the need for change.

To foster change, key members of Congress should be constantly exposed to and educated in Deming's Management Philosophy. This could be accomplished by

continuously educating the general public on Deming's Management Principles to foster the required cultural shift that Deming stresses must occur. This course of action will instill and promote constituency support for the forces of change.

C. RESEARCH QUESTIONS

1. Can implementation of Deming's Management Philosophy, help eliminate the reasons why firms are leaving the defense industrial sector?

Based on the principles established in Chapter III, it appears that if these barriers cannot be eliminated or effectively reduced, implementation of the Deming Management Philosophy in the DAS may not be effective

2. What is Dr. W. Edwards Deming's Management Philosophy?

Deming's Management Philosophy is a broad and holistic orientated thought process that emphasizes a system of continuous improvement through cooperation. Deming bases his Management Philosophy on what he terms as his System of Profound Knowledge. This system is a combination of four major behavioral disciplines: a theory of Variation, a theory of Knowledge, a theory of Psychology, and a theory of Systems. Deming developed his 14 Points and Deadly Diseases to define his philosophy and establish a foundation for his Total Quality Process

3. What was the Congressional intent of the Competition in Contracting Act of 1984 (CICA)?

The intent of Congress in passing CICA, was to motivate the Department of Defense to restructure its procurement process to foster "full and open" competition, remove preference for sealed bids, curb cost growths, and promote cost savings, technical innovation, and fair play

4. What are the concerns and reasons prompting firms to leave the defense industry?

Many reasons were identified by the industry respondents of the surveys, expressing their dissatisfaction and decreasing desire to continue to conduct business within the defense sector. The most overwhelming of the reasons indicated was management's unwillingness to change its attitude in the way it conducts business within the defense sector. Repeatedly identified, and was the continuing attitude by management is that all contractors are criminals as indicated by their desire to make a profit. This attitude has significantly fueled industry's desire to decrease its business within the defense sector.

D. SUGGESTIONS FOR FURTHER RESEARCH

1. Perform a study to see if any progress has been made to stimulate management's unwillingness to change its attitude.
2. Conduct a study on how industry can help provide a means to educate the general public and top management on Deming's Management Principles.
3. Conduct a study on what the Department of Defense can do to help counter the adversarial relationship that has developed between Government and industry.
4. Conduct a study to determine how the Deming Management Philosophy can be modified to be successfully implemented within the Department of Defense.

APPENDIX A

Naval Postgraduate School Thesis Survey

SUBJECT: BARRIERS TO IMPLEMENTING TOTAL QUALITY MANAGEMENT (TQM) PRINCIPLES IN THE DOD ACQUISITION PROCESS

DISCUSSION: TQM is the management philosophy espoused by the Department of Defense. This management philosophy portrayed by Dr. W. Edwards Deming in his Fourteen Points, conflicts with many of DoD's acquisition and non-acquisition related regulations, policies, and congressionally imposed statute(s)

PURPOSE: The purpose of this study is to gather data which reflect the opinions of government and industry business decision makers who are knowledgeable of Dr. Deming's Fourteen Points and the DoD acquisition process. Specifically this questionnaire will seek to identify impediments based on *statute, regulation or policy*, that stand in the path of DoD towards fully implementing TQM in the total acquisition process. It is recognized that DoD's definition of TQM and the Fourteen Points do not entirely match, however, in order to provide a common basis from which to characterize TQM, Dr. Deming's Fourteen Points and Deadly Diseases are utilized herein.

For reference, Deming's 14 points are as follows:

1. Create constancy of purpose for improvement of product and service.
2. Adopt the new philosophy
3. Cease dependence on inspection to achieve quality
4. End the practice of awarding business on the basis of price tag alone. Instead, minimize total cost by working with a single supplier
5. Improve constantly and forever every process for planning, production, and service.
6. Institute training on the job
7. Adopt and institute leadership
8. Drive out fear
9. Break down barriers between staff areas
10. Eliminate slogans, exhortations, and targets for the work force
11. Eliminate numerical quotas for the work force and numerical goals for management.
12. Remove barriers that rob people of pride of workmanship. Eliminate the annual rating or merit system
13. Institute a vigorous program of education and self-improvement for everyone
14. Put everybody in the company to work to accomplish the transformation

In addition, Dr. Deming points out the Deadly Diseases which impact on the success or failure of implementation of the Fourteen Points (it is recognized that several of these are societal in nature):

1. Lack of constancy of purpose to plan product and service that will have a market and keep the company in business, and provide jobs
2. Emphasis on short-term profits
3. Evaluation of performance, merit rating, or annual review
4. Mobility of management, job hopping
5. Management by use only of visible figures, with little or no consideration of figures that are unknown or unknowable
6. Excessive medical costs
7. Excessive costs of liability, swelled by lawyers that work on contingency fees

REQUESTED ACTION: It is requested that the survey be completed by an expert familiar with DoD's acquisition process, as well as familiar with Dr. Deming's quality concepts. Quality responses by expert opinion will be highly regarded

SECTION I - DEMOGRAPHICS

- Name (optional) _____
- Organization _____
- Job Description/Title _____
- No. years acquisition experience _____
- Familiarity With TQM Concepts (please check one):
☐ Expert
☐ Very Familiar
☐ Somewhat Familiar
☐ Unfamiliar Concept

Note: If you marked Expert or Very Familiar, please briefly explain your exposure to Dr. Deming's concepts:

- Would it be acceptable to contact you for a short telephone interview for clarification purposes?

☐ YES • Phone: _____
☐ NO

SECTION II - BARRIER IDENTIFICATION

Below are listed often cited barriers to implementing TQM in the DoD acquisition process. In completing this section please select either YES or NO to indicate whether or not you perceive the listed category to be a barrier to successfully implementing TQM in the DoD acquisition process. IF YOU CHOOSE YES, INDICATE, BY NUMBER THE SIGNIFICANCE OF THAT BARRIER BY USING THE FOLLOWING MEASURES

- | | |
|------------------------|--------------------|
| 1 NOT SIGNIFICANT | 4 VERY SIGNIFICANT |
| 2 SOMEWHAT SIGNIFICANT | 5 INSURMOUNTABLE |
| 3 SIGNIFICANT | |

Also, please list whether a barrier is primarily driven by Government Law or Regulation (GLR), Internal Policy (IP), or Neither (N)

<u>Barrier</u>	<u>YES</u>	<u>NO</u>	<u>Don't Know</u>	<u>GLR / IP / N</u>
1 Management Willingness to Change	_____	_____	_____	_____
2 Competition and Contracting Act of 1984	_____	_____	_____	_____
3 Buy American	_____	_____	_____	_____

(Continued)

<u>Barrier</u>	<u>YES</u>	<u>NO</u>	<u>Don't Know</u>	<u>GLR / IP / N</u>
4. DoD Acceptance and Inspection Procedures	_____	_____	_____	_____
5. DoD Specifications	_____	_____	_____	_____
6. Industrial Base Concerns	_____	_____	_____	_____
7. Contractor Cost Recovery Systems	_____	_____	_____	_____
8. Ethics	_____	_____	_____	_____
9. Training	_____	_____	_____	_____
10. Socio-Economic Programs	_____	_____	_____	_____
11. Industry Labor Unions	_____	_____	_____	_____
12. Congressional Oversight	_____	_____	_____	_____
13. Single Year Budgeting	_____	_____	_____	_____
14. Management Mobility	_____	_____	_____	_____
15. OMB Circular A 109	_____	_____	_____	_____

Please list other significant categories you feel are barriers.

16. _____	_____	_____	_____	_____
17. _____	_____	_____	_____	_____
18. _____	_____	_____	_____	_____

SECTION III - BARRIER RANKINGS

In this section, please rank the five (5) barriers you perceive to be the most significant towards impeding implementation of TQM concepts in DoD's acquisition process.

(Please place the *Barrier* number from SECTION II in the space provided)

- 1st Most Significant Barrier _____
- 2nd Most Significant Barrier _____
- 3rd Most Significant Barrier _____
- 4th Most Significant Barrier _____
- 5th Most Significant Barrier _____

SECTION IV - TOP BARRIER OPEN EXPLANATION

In this section, please choose the two categories, which to you, represent the *most significant barriers* to implementing TQM in the DoD acquisition process. Along with naming the categories please briefly explain *why* you perceive these barriers as the most significant and *how* these barriers might be overcome. Discussion of professional experience and insights are respectfully requested in this section (*please use additional space if needed*)

BARRIER 1 (Why is this barrier significant, and how might it be overcome?):

BARRIER 2 (Why is this barrier significant, and how might it be overcome?):

RETURN INSTRUCTIONS

**PLEASE RETURN THIS SURVEY IN THE ENCLOSED PRE-
ADDRESSED STAMPED ENVELOPE
NO LATER THAN 15 SEPTEMBER 1990.**

**YOUR INTEREST AND TIME ARE VERY MUCH
APPRECIATED. THANK YOU.**

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A. INTRODUCTION

During the Fall of 1990, I had the opportunity to discuss TQM survey formats and techniques with LCDR Andrew Brown, SC, USN. From our discussions, it was determined that our thesis topics overlapped in many areas, particularly with regard to utilizing Dr. Edwards Deming's Management Philosophy as an analysis tool. Both of our theses incorporated the use of a survey questionnaire to gather data for analysis. It was therefore evaluated that one questionnaire could provide the raw data for both of our research efforts. The following sections provide an analysis of this data.

B. SURVEY OBJECTIVE

The first objective of this survey was to gather data from both industry and Government managers on what they perceived as existing barriers impeding the implementation of Deming's Management Philosophy within the DoD.

The second objective of the study was to evaluate the participants' comments regarding to what degree they perceived management was capable of changing the system, and correcting these perceived problems. It was therefore, necessary to identify to what extent these problems were influenced by Government laws and regulations, internal policy, or neither.

C. SURVEY FORMAT

The survey questionnaire was formatted around the guiding principles of Deming's Management Principles, to serve as an analysis tool. The sections were composed of:

1. Section I Demographics
2. Section II Barrier Identification
3. Section III Barrier Ranking
4. Section IV Comments (Top Barrier Open Explanation)

The study centered on the barrier ranking from respondents, as well as the expanded written section on the respondent's top two identified barriers

D. SOLICITATIONS, RESPONSES, AND DEMOGRAPHICS

1. Solicitations

Approximately 65 questionnaires were provided to various individuals identified from several sources, the Joint OSD - Air Force - Industry Study of June 1989, and sources identified in quality management literature. These individuals were chosen in an effort to gather data from various high level/experienced acquisition managers, both from industry and Government who possessed a working understanding of the Deming Management Philosophy. [Ref. 52:p 24]

2. Responses

Of the 65 questionnaires distributed, 34 responses were received. This indicated a 52% response rate from those individuals surveyed. The detail and in depth comments of the respondents reflected that this subject prompted a high degree of interest towards the improvement of the DAS, both from the industrial and Government sectors.

3. Demographic Data

Table 5 reflects the average acquisition experience of each respondent, the sector they worked in industrial or Government, and the respondents familiarity with Dr. Deming's Management Philosophy. Table 6 lists the generic job position/title of the respondents. Actual names and job titles will not be utilized for the sake of anonymity.

E. SURVEY RESPONSE SUMMARY

As depicted in Table 5, the respondent population consisted of 21 Government personnel (62%), and 13 industry personnel (38%). Thirteen respondents considered themselves TQM experts, 17 judged themselves as very familiar with TQM concepts, and 4 judged themselves as somewhat familiar with TQM concepts.

Respondent Acquisition And TQM Background

Years of Acquisition Experience

(By LEVEL OF TQM Experience)

Table 5

EXPERT	VERY FAMILIAR	SOMEWHAT FAMILIAR
21*	9	17
15*	24	15
28*	27	21
28*	20	5
12	24	
10	12*	14.5 Avg.
15	10*	
1	23	
31*	18	
15*	10	
30*	20*	
11*	20	
5	14	
	26	
17.1 Avg.	12*	
	30*	
	10	
	18.2 Avg.	

Notes: 1) * denotes DoD industry respondent

2) There were 21 Government respondents (62%) and 13 industry respondents (38%).

3) With regard to familiarity Deming Management Philosophy and the TQM concept, 38% of the respondents considered themselves as Experts, 50% as Very Familiar, and 12% as Somewhat Familiar.

Respondent Job Position/Title

Table 6

Senior Vice President - Well Known Quality Management Consulting Firm
Special Assistant to the Director of Engineering
Professor and Consultant - Assistant to Dr. Deming
Policy Manager
Director of Technical Data - DoD Systems Command
TQM Coordinator - DoD Systems Command
Professor - Student of Dr. Deming for 20 Years
Vice President - Group Product Integrity - Large Corporation
Assistant to the Commander for Quality - Large DoD Component HQ
Vice President - Reputable Industry Association
Manager of Quality Improvement - Large Company
Professor of Engineering Management - Advanced Degree University
Director of Design Policy
Contracts Division Head
Professor of Contract Administration
Professor of Contract Management - Advanced Degree University
High Level DoD Civilian Appointee
Deputy Assistant Commander for Engineering and Design
Assistant Deputy for Special Projects
Contract Specialist - TQM Liaison for Regional Contracting Center
Manufacturing Manager
Assistant for Corporate Quality
Director, Contract Policy
Corporate Director for Quality - Large Corporation
Senior Quality Executive - Industry Association
Professor - Director of Business Management Department
Branch Head at Systems Command
Deputy Director for Engineering Design
President of Small (8A) Consulting Firm
Procurement Analyst - Intermediate DoD Command
Director, Continuous Quality Improvement - Large Corporation

F. BARRIER OVERVIEW

The objective of this section was to identify those barriers which the survey respondents perceived as potential obstacles to the successful implementation of the Deming Management Philosophy within the DoD. Based on the principles established in Chapter III, it appears that if these barriers cannot be eliminated or effectively reduced, implementation of the Deming Management Philosophy in the DAS may not be effective. As a result, firms which have successfully incorporated Deming's Management Philosophy (as well as those that haven't), may not be interested in continuing to conduct business in the defense sector.

Table 7, identifies the relative significance of each barrier as they were ranked by the respondents in Section III of the survey questionnaire. The barriers are arranged in order of frequency, with the most frequent barrier indicated being first, and so on. There is one exception to this method. For the purposes of this research effort, survey barriers 4 and 5, identified in section II of the survey, were combined to form the barrier: Government measurement practices. This barrier generically encompasses the areas concerning acceptance, audit, specifications, and inspection procedures within the Government.

Following each table will be a descriptive synopsis of the data extracted from the respective table.

1. Top Five Barrier Rankings

In Section III of the survey questionnaire, each respondent was asked to identify through ranking, the five barriers they perceived to be the most significant. The results of the respondents ranking of the top five barriers is depicted in Table 7.

SECTION II TOP FIVE BARRIER RANKINGS

TABLE 7

BARRIER	POSITION RANKED	1	2	3	4	5	Total
Management Willingness to Change		18	4	4	4	2	32
Government Measurement Practices		3	4	3	3	6	19
Competition in Contracting Act of 1984		5	5	3	2	3	18
Training		0	4	3	6	4	17
Congressional Oversight		5	3	1	2	5	16
<hr/>							
Single Year Budgeting		1	1	2	1	4	9
Management Mobility		1	0	2	3	1	7
Contractor Cost Recovery Systems		0	0	2	2	2	6
Ethics		0	1	1	1	1	4
Socio-Economic Programs		0	1	0	1	1	3
Industry Labor Unions		0	2	1	0	0	3
Buy American		0	0	2	0	0	2
OMB Circular A-109		0	0	0	1	0	1
Industrial Base Concerns		0	0	0	0	0	0

a. Table 7 Synopsis

- 1 "Management's Willingness to Change" was identified as one of the top five barriers 32 out of a possible 34 times. Nearly twice as much as any other barrier
- 2 "Management's Willingness to Change," was identified by 53% (18 times) of the respondents as the number 1 barrier impeding the possible implementation of Deming's Management Principles.
- 3 The largest spread (13), occurred between the highest frequency response (Management Willingness to Change) and the second highest frequency response (Government measurement practices)

4. There appears to be a distinct separation (dotted line), between the frequency in which the top 5 barriers on Table 3 were identified, and the other barriers.
5. Not included (by any respondent) in the top 5 ranking was the barrier Industrial base concerns.

2. Weighted Score Ranking of Top Five Barriers

Table 7, identified the frequency with which each barrier appeared in each of the top five positions. Table 8, utilized a weighted scoring method to reflect the significance of each barrier ranked in one of the top 5 positions. The weighting of the points assigned to the respondent's rankings were as follows:

<u>Barrier Ranking</u>	<u>Points Assigned</u>
1st most significant barrier	5
2nd most significant barrier	4
3rd most significant barrier	3
4th most significant barrier	2
5th most significant barrier	1

Weighted Score Based on Respondent's Top Five Barrier Ranking

Table 8

BARRIERS	WEIGHTED SCORE BASED ON TOP 5 RANKING	PERCENT OCCURRING IN TOP 5
Management Willingness to Change	168	94%
Competition in Contracting Act of 1984	61	53%
Government Measurement Practices	52	56%
Congressional Oversight	49	47%
Training	41	50%
-----	-----	-----
Single Year Budgeting	21	27%
Management Mobility	18	20%
Industry Labor Unions	12	9%
Contract Cost Recovery Systems	12	18%
Ethics	10	12%
-----	-----	-----
Socio-Economic Programs	7	9%
Buy American	6	6%
OMB Circular A-109	2	3%
Industrial Base Concerns	0	0%

a. Table 8 Synopsis

1. The barriers CICA and Congressional oversight, occurred lower in frequency on Table 7, however on Table 8, utilizing their weighted score they were identified as higher in significance than the barriers. Government measurement practices and Training.
2. There seem to be, three distinct groupings of barriers (identified by dotted line) based on the weighted scoring method.
3. The same six top barriers were identified on both Tables 7, and 8.

3. Top Six Barriers Significance

Based on the results of Tables 7 and 8, the top six barriers identified, were determined to be the principle barriers impeding the potential successful implementation of the Deming Management Philosophy within DoD. Table 9, reflects the significance of the top six barriers as identified by the respondents in Section II of the survey questionnaire. The purpose of Section II, was to have each respondent indicate to what degree they perceived each barrier as an impediment towards the possible implementation of Deming's Management Philosophy within the DoD. To determine this, another weighted scoring method was utilized. Based on the scale identified in Section II, the points were distributed as follows:

<u>Barrier Significance</u>	<u>Points Assigned</u>
1: Not Significant	1
2: Somewhat Significant	2
3: Significant	3
4: Very Significant	4
5: Insurmountable	5

BARRIER SIGNIFICANCE

TABLE 9

SIGNIFICANCE RANKING	5	4	3	2	1	AVERAGE
TOP SIX BARRIERS						
Management Willingness to Change	1	22	8	1	0	3.72
Competition in Contracting Act of 1984	1	10	14	4	0	3.27
Government Measurement Practices	0	13	14	5	0	3.25
Training	0	10	13	5	1	3.10
Congressional Oversight	2	13	9	6	1	3.29
Single Year Budgeting	0	9	17	6	0	3.09

a. Table 9 Synopsis

1. "Management's Willingness to Change," was again ranked as the number 1 barrier. The average significance factor of 3.72, indicated that the respondents identified this barrier as the most significant obstacle impeding the implementation of TQM. The nearest other barrier was .33 percentage points lower in its Significance rating.
2. The barrier Congressional oversight, based on the results of Table 9, had the next highest significance factor at 3.29.
3. The only barriers identified on the questionnaire by any respondent as insurmountable, were "Management's Willingness to Change," Congressional oversight, and CICA.

4. Barrier Control

Table 10, reflects the respondents perceptions as to what extent each barrier is controlled or influenced by Government Law or Regulation (GLR), Internal Policy (IP), or Neither (N). Based on the data gathered from Section II of the survey questionnaire, the barriers are listed in order, starting with the barrier perceived to be influenced or driven by the highest level of perceived GLR.

Barrier Control

Government LAW ORaw or RegulationN (GLR), Internal Policy (IP), or Neither

Table 10

TOP SIX BARRIERS	CONTROL RANKING	GLR	IP	NEITHER	NOT SURE
Management Willingness to Change		6%	9%	55%	19%
Competition in Contracting Act of 1984		70%	6%	0%	24%
Government Measurement Practices		28%	44%	9%	19%
Training		7%	34%	38%	21%
Congressional Oversight		52%	6%	19%	23%
Single Year Budgeting		66%	12%	3%	19%

a. Table 10 Synopsis

1. The top three barriers identified to be driven primarily by GLR were CICA, Congressional oversight, and Single year budgeting. 70% of the respondents indicated that they perceived CICA to be driven by GLR.
2. Government measurement practices, was perceived to be primarily driven by IP (48%)

3. Training was perceived to be driven by both IP (34%), and Neither (38%). Neither reflects the respondent's opinions that attitude equally impacts the control of training as a barrier.
4. 66% of the respondents indicated that the primary controlling influence on "Management's Willingness to Change," was neither GLR or IP, but attitude.
5. It appears on average that 22% of the respondents could not decide, or were unable to determine to what extent GLR, IP, or N, imparted an influence on the barriers.

G. CHAPTER CONCLUSION

The survey questionnaire successfully provided data to determine the perceived barriers impeding the implementation of Deming's Management Philosophy within DoD. It should be noted that while the order of the top six perceived barriers shuffled somewhat on each table, their composition did not. The same six barriers were identified on each table. The one exception to the barriers shuffling in order, was "Management's Willingness to Change," it remained in the top ranking on each table, identifying it as the most significant barrier impeding the possible implementation of Deming's Management Philosophy within the DoD.

APPENDIX B

DEFENSE PROCUREMENT "PAPERWORK BURDENS" STUDY: WHY FIRMS ARE LEAVING THE INDUSTRIAL BASE

Survey

This questionnaire is part of a three-month study. It will determine whether there is an exodus of firms from the Defense sector and/or a marked reluctance on the part of corporations to enter the defense business as a result of the "paperwork burdens" imposed by the Department of Defense. The results of this study will be used to institute corrective action.

The following questions can be answered anonymously. However, if you prefer to discuss these issues, please provide your name and phone number. _____

I. Industrial Attitudes toward the Defense Market

1. What is your experience in Defense Business?

	Prime	Sub
A. We have never attempted to enter the Defense Market	()	()
B. We have unsuccessfully attempted to enter the Defense Market	()	()
C. We no longer conduct business with the Dept. of Defense (since 19__)	()	()
D. We are currently in the Defense market	()	()
E. We have reduced our involvement in the Defense market (beginning in 19__)	()	()

2. What is your attitude toward obtaining Defense business?

	Prime	Sub
A. We do not want Defense business	()	()
B. We are in Defense business but intend to diminish our role or leave the market (as of 19__)	()	()
C. We are in the Defense business and intend to remain	()	()
D. We are interested in entering the Defense market	()	()

3. What are the primary administrative burdens that you have experienced in doing business with the Dept. of Defense? For example, payment, bidding, accounting or auditing procedures, technical data rights, specifications, etc. (Please rank these in order of importance. Specific examples would be most helpful.)

4. What change(s) in Defense procurement would provide the biggest incentive for you to enter, re-enter and/or increase your role in Defense business?
-
-
-

5. Do you produce the same or similar product(s) for the commercial and defense markets? Yes () No ()

If yes,

- A. What percent is the defense market? _____ %
B. Are they produced in the same facilities? Yes () No ()

If not, why not? _____

II. Company Classification

In order to analyze the above answers within the context of the entire industrial base, it is necessary to obtain the following details about your firm.

1. Classification of your company

A.	Your product or service?	B.	SIC code (if known)	C.	Approx. * employees
	_____		_____		_____

2. Please provide the breakout of your total business.

Prime Contractor	Subcontractor	Commercial	Other
_____ %	_____ %	_____ %	_____ %

3. What is your current annual sales volume?

A.	Under \$1M	()
B.	\$1M - \$10M	()
C.	Over \$10M	()

Thank you for your assistance. Copies of the results of this survey will be available. All company information will remain anonymous. The purpose of this survey is to enable the Department of Defense to institute corrective action.

Please return this survey to:

Defense Systems Management College
ATTN: DRI (Lt. Col. Dave Scibetta, USA)
Fort Belvoir, VA 22060

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